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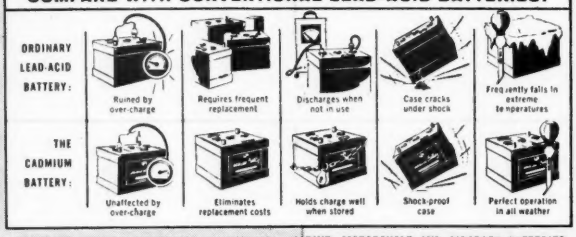

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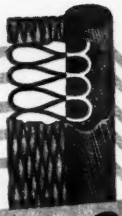

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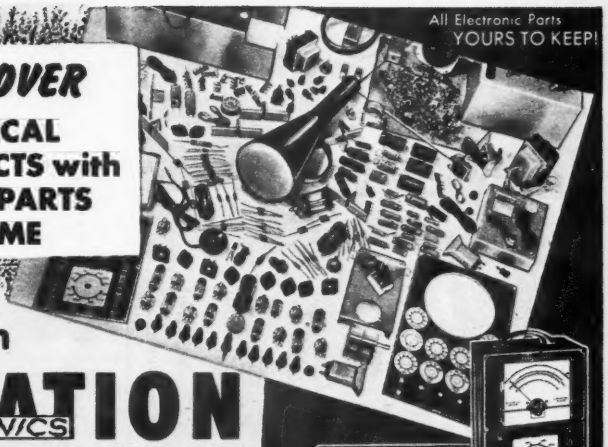

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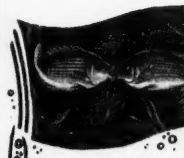

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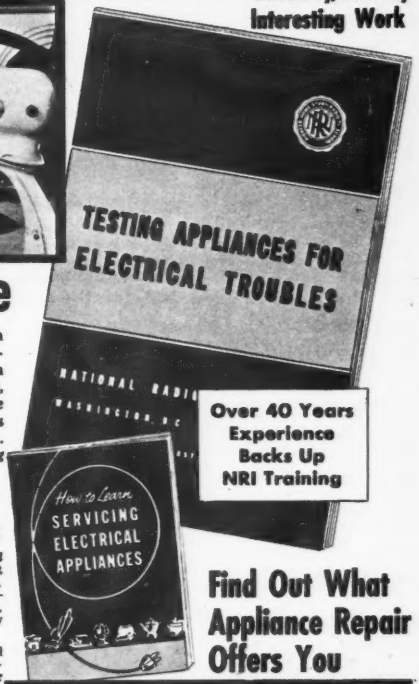

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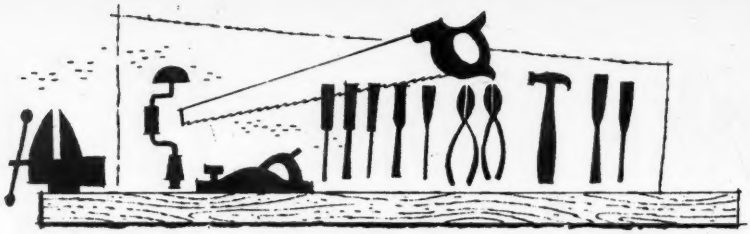
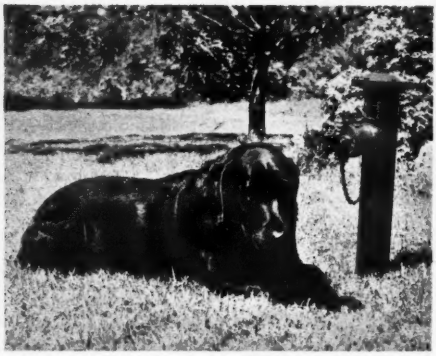


THE EDITOR'S WORKBENCH



Dinah, widow of Uncle Tom's famous dog Joe, and the hydrant (see text) at Joe's grave.

● *Memorial To Joe*

"He was born with a gift of laughter and a sense that the world was mad," wrote Sabatini about his swashbuckling character *Scaramouche*. Somehow those words always make me think of another swashbuckler I once knew, a philosopher-dog named Joe.

Joe was not one to take any guff, real or fancied, from others of his kind. And thanks to a mighty physique and a fighting heart like Jack Dempsey's, he never lost a decision during a long career of bloody brawls. Just once he battled to a draw . . . against a pack of wild dogs he challenged in a burst of over-zealousness . . . but the pack was never seen again so it should go down in the books as a TKO, for Joe.

Toward human beings, however, Joe's attitude was tolerant, amused, forgiving—and watchful, as if he were aware that at any moment even the best of us might suddenly run amuck, like a fly-tormented moose. He expressed this amiably skeptical philosophy by eloquently and ceaselessly waving his great black tail back and forth with the slow, studied precision of a metronome. Only when Joe was sprawled in sleep on the most expensive upholstered furniture in the house did that friendly plume stop moving. At his master's "Let's go, Joe!" the tail was going again and the rest of the dog hurtled into wide-awake alertness with the speed of a jet fighter pilot responding to "Scramble!"

For Joe was a professional, trained to a razor edge of perfection in his specialty of finding and bringing back the ducks and geese shot down by a kindred Scaramouche named Tom McCahill. Even as Tom admired his black Labrador retriever's genius as a hunter, so did Joe seem to relish the fact that his man was a real pro behind a steering wheel. Nothing in the non-hunting line delighted Joe more than to stand in the back seat, wagging that big tail, while Tom barreled along Daytona Beach at 120 or drifted into a turn at Lord-knows-how-many mph.

Joe was killed by a taxicab in Florida in March of 1954. But MI readers, it seems, haven't forgotten the dog whose personality was so engaging that the headwaiter at Maxim's in Paris once had an extra chair set up at the table so that "le chien Joe" could eat with his master and mistress in the swank café.

Last Memorial Day a couple of remembering people in Menlo Park, Calif.—Mr. and Mrs. E. F. Beveridge—sent Tom a beautiful little fire hydrant, expertly hand-turned out of wood by Mr. Beveridge, as a gift from their own pooch Tuffy, "a little mutt of questionable ancestry but unquestionable charm." A brass plaque is engraved: "From Tuffy To Pinny and Dinah In Memory of Joe."

See you next month.—*Bill Parker* •

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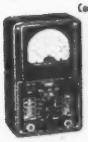
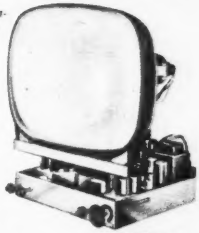


Combination Voltmeter-Ammeter-Ohmmeter



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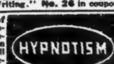

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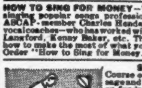

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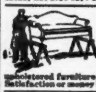

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INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

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Invention Clinic

Joseph H. Kraus

In this column each month Mr. Kraus will answer as many letters as space permits on those subjects he feels to be of widest general interest. Time does not allow him to reply to any letters except those printed here. Address your questions to the Invention Clinic, *Mechanix Illustrated*, 67 West 44 St., New York 36, N. Y.

Magazine Flashgun

Frank Riou of Arborfield, Saskatchewan, Canada, has built a model of a magazine flashgun which fires as quickly as the trigger is pulled. He has about given up the idea in favor of the electronic units which are getting smaller, cheaper and better. What is our opinion of the gun?

The use of multiple flashes at high speed is limited. Only a few cameras are provided with a means to advance the film instantly and set the shutter for the next picture. A second use is in making multiple exposures on the same negative. So increasing speed between flashes serves no great practical purpose. Nevertheless, your design has the advantage of convenience in that the cameraman can give full attention to his subject. Against this you must weigh the possibilities that the electronic flashguns will become more suitable in all ways, are likely to be less costly per flash to operate, hence more likely to sell.

If you can get someone to back the production of this item financially and get it on the market quickly, you may be able to reap some benefit. We recommend a search.

Positioning Outlet Box

D. D. Shore of Beaufort, N. C., sends a copy of his patent drawings and a description of an electrical outlet box fitted with inwardly folding points which project through wallboard or sheet rock and serve to position a template. A drawn line around the template then defines where the board is to be cut for perfect register with the box. What is our opinion of this device's merits?

This is like asking us to measure the value of a shoelace which costs more money but lasts longer. We don't know how long it will last or how much more it costs. We suspect that you will have no easy job to put this across, and doubt that you can prove any real saving in overall construction costs.

Pressure Oiler

Willis J. Williams of Jersey City, N. J., has applied for a patent on a pressure oiler for high speed machinery. At present he employs gas for pressure. Should he also apply for patents designating other means for applying the pressure?

This is a detail which you should discuss with your patent attorney. Seemingly the method for applying the pressure is not claimed to be of importance. If you are granted a patent it will be because of the design of the connection.

Nevertheless, your attorney should specify that you are not limited to obtaining the pressure by the method shown and that other methods also could be used.

Needle Threader

Mrs. J. C. Lounsbury of Dallas, Texas, inherited from her husband patents and working models of needle threaders, both for hand sewing and for the sewing machine. These relate to pin-type, self-aligning threaders, instead of the hook-type. The first patent expires next year, another runs for ten years more. One of the threaders can be made an integral part of a sewing machine. She also wants to know why the Patent Office accepted the statement by another inventor to the effect that he is offering the first pin-type needle threader when as a matter of fact her husband's patent was issued ten years before. What can she do with the patents? What recourse does she have if someone starts to manufacture under the later patent?

There are several self-aligning needle threaders on the market for both hand and

[*Continued on page* 26]

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

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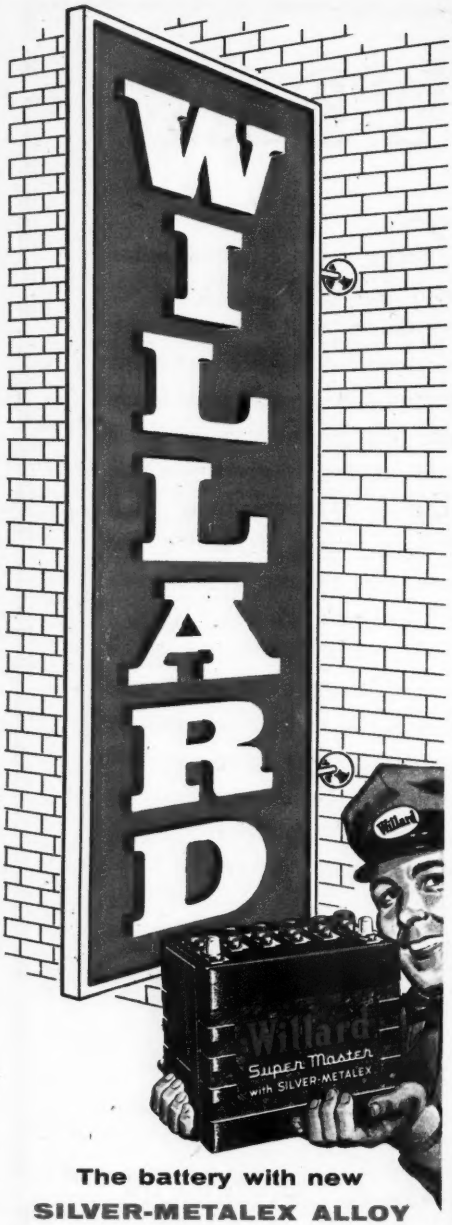

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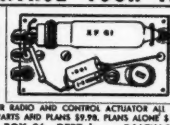

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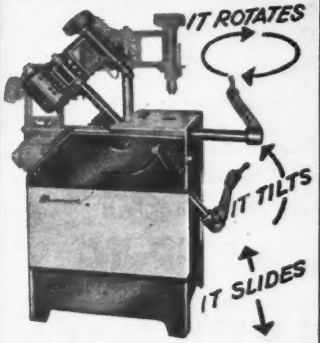

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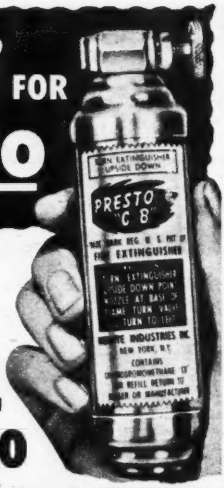

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MERLITE INDUSTRIES (Presto Div.), Dept. X-10N
114 E. 32nd. St., New York 16, N. Y.

I enclose $1.00 for which please send me regular-size $4.95 PRESTO as a demonstrator. I agree to demonstrate it to myself and friends. This sample becomes mine to keep at no additional cost when I send you order for 6 or more Prestos. If I decide NOT to sell, I will return the PRESTO to you and you will refund my $1.00.

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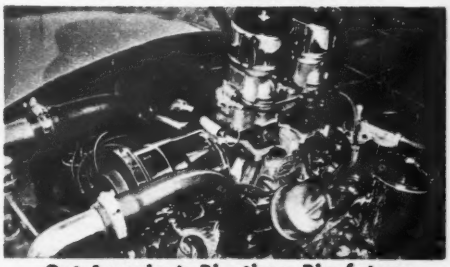

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Dear Editor

Address mail to: MECHANIX ILLUSTRATED, Letters Editor, 67 West 44th Street, New York 36, N. Y.

● *Hexes Mama-In-Law*

After reading MI's Voodoo Do-It-Yourself story in the Sept. issue, I went out and bought one of those Voodoo Kits. I now give the needle to the mother-in-law-like doll I made. I haven't seen any practical results as yet but my ulcer seems to have simmered down.

John Tetzel
Mt. Vernon, N. Y.

● *Question*

What type of letter do I have to send to be published?

W. B. Schroeder
Napa, Calif.

This type.

● *September Mystery Solved*

According to my calculations, Nancy will weigh as much as Susan and Janet together at four months.

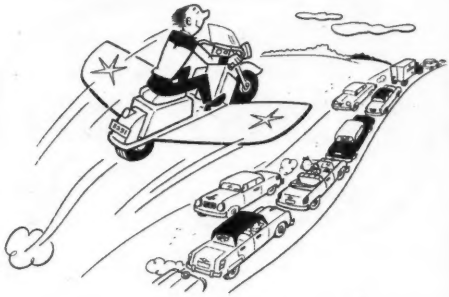
Raymond Zigmund
Milwaukee, Wis.

● *MI's November Mystery*

The speed of a train can be estimated by a passenger counting the number of clicks the wheels make on the track in a definite period of time. On a certain railroad the speed in miles per hour is numerically equal to the number of clicks heard in 22.5 seconds. What is the length of the rails used on this railroad?

Ed Oliver, Jr.
Atlanta, Ga.

● *Sky Commuters*



I got a great idea from your story All About Motor Scooters in Aug. MI. Why don't the motor scooter makers design a job that has detachable wings so that commuters could fly to and from work? The wings could be taken off when the scooter is used at home on weekends.

Randolph Bartley
Reno, Nev.

● *For Sale*

About a year ago I remember your mem-
[*Continued on page* 24]

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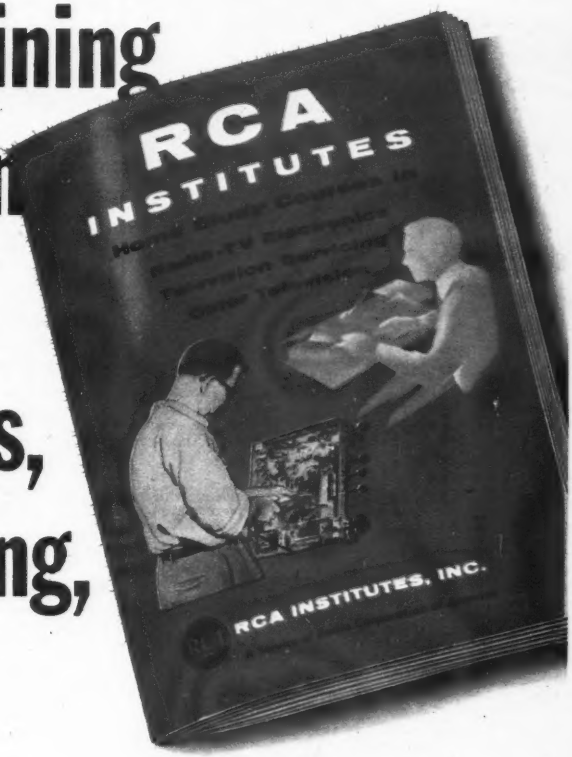

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Dear Editor

[*Continued from page* 22]

tioning in Dear Editor that old issues of Flying and Glider Manual had increased to fantastic value.

I have a copy of the 1932 Flying and Glider Manual and a 1940 issue of Flying Manual. The Flying Manual has plans for only one glider. I would like to sell them.

J. K. Radich
2923 No. 31st Street
Tacoma, Wash.

Anybody interested?

● *Pogonotomist*

Hey, what book were you guys reading when you wrote about the Pogonotomist in Speaking of Jobs (July '56 MI)? One I've got here with Webster's name on it says a gent who fiddles with beards is a pogonologist, not a pogonotomist as you stated.

Allison Copmen
St. Louis, Mo.

Al, why don't we just call him a "little shaver" and let it go at that?

● *MI Problem*

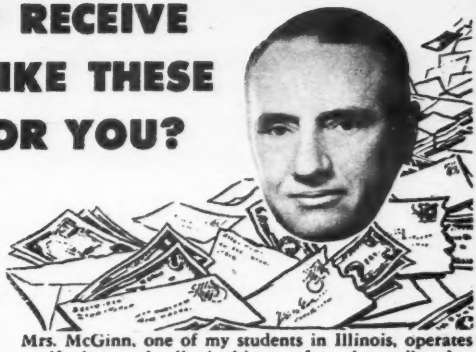
How unlucky we non-American readers of MECHANIX ILLUSTRATED are. We pay $6 instead of the regular $3 price for a subscription and receive MI two months late! To make matters worse, we cannot take part in any contest such as the MI Safety Contest you began in the May issue.

I protest strongly in the name of humanity against this injustice and butchery.

F. U. Bhatti
Alununirah, Dhahran
Saudi Arabia

We very specifically state in our rules that MI contests are open only to readers on the North American Continent, including Canada. We know that you receive MI late. That is one reason we cannot permit readers in foreign countries to enter our contests—we wouldn't be able to set a reasonable time limit for submitting entries. But of course we welcome entries from all readers to our many other money-making departments: Inventions Wanted, Pin-Up Car, Freddie Fumbles, Photo Contest, etc.

WOULD YOU LIKE TO RECEIVE STACKS OF LETTERS LIKE THESE EACH WITH MONEY FOR YOU?



I have found a proven formula for quick success in making money. Others I've shared it with also have been successful. Would you like to know about it?

It's simpler than you might think – just buying good imports at next-to-nothing foreign prices and selling them in the U.S. by mail order or at wholesale to stores.

To most people, importing smacks of mystery, romance – and "costly" things for collectors. Actually, any capable and ambitious man or woman should learn import-export quickly. And, there are thousands of beautifully made imports obtainable at trifling cost abroad to sell in the U.S. by mail order. There are also great opportunities in exporting U.S. products.

Native villages in Africa, romantic Vienna, bustling Copenhagen, mysterious Hong Kong – yes, countryside hamlets and great cities all over the world produce fascinating products.

Using my plan, you don't have to travel abroad unless you want to. You don't even have to know a foreign language. And, there is no face-to-face selling in mail order.

I have proven this plan with 103 imports – and the opportunities for the sale by mail of thousands more are breathtaking in their possibilities. Hunting knives and binoculars from Germany, silverware from Sheffield, England – hand-carved art objects from Africa – all costing less than $1 abroad have values up to $5 or more here and are big sellers by mail order.

Monthly bulletins sent free to those who follow my plan show suppliers of new and desirable imports.

As I write this, I am receiving as many as 1,000 cash orders a day for imported clocks – all by mail order. They cost me only 63¢ and I sell them far below the U.S. market – a terrific bargain and a wonderful seller. And, I don't stock them as they are shipped direct to the buyers from abroad, *after I receive the cash.*

So you see, it is even possible to conduct a business of this kind without investing in merchandise.

Mrs. McGinn, one of my students in Illinois, operates a gift shop and sells Arabian perfume by mail order. F. Basler, N. J., sells Aztec bird feather pictures from Mexico to stores and by mail order.

You might ask, "Why do you let others in on your plan? Why don't you keep it all for yourself?" The answer is that items for import are countless. No one person could possibly handle even a small proportion of them. There's plenty of business in import-export for you and me and many others.

If you are sincere and really open-minded to a new and different opportunity – one which may change your whole idea of the kind of money you can make in your own full or part time business – write today for full details. Air mail reaches me overnight.

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Invention Clinic

[*Continued from page* 16]

sewing machine use. One of these is manufactured by Nelpin Manufacturing Company of Brooklyn, and distributed widely by W. C. Burroughs Company, both of New York. There are five other manufacturers in the country, one of which makes such threaders for surgical needles. Whether or not the pin-type is superior to the hook-type can be determined only through comparative tests. As most of these manufacturers are primarily concerned with trying to promote their own inventions, you may find difficulty in gaining their interest. But with the keen competition which has developed in the sewing machine field, it might be well for you to contact these manufacturers as well as the 16 manufacturers who make sewing machine attachments. Remember that self-threading needles also are on the market.

Statements made in the body text of a patent are not claims. Nearly every patent mentions something new, better, original, etc. Don't let this bother you. It is the claims which were granted and how they infringe on the claims made in the patents you hold that become important. Try to determine what the other inventor is doing with his patent. If he is manufacturing profitably, or getting royalties, consult your attorney for a recommended procedure.

Auto Safety Device

Wallace T. Fifarek of West Allis, Wis., suggests a radio receiving mechanism in an automobile which will sound a signal whenever the car ahead comes to a stop. When the brakes are applied a signal will be sent to the car behind. Such a device will enable drivers to get split-second warnings and react much quicker than by the tail light method. Will we give him our opinion?

[*Continued on page* 28]

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Invention Clinic

[*Continued from page 26*]

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Meat Pie

Mrs. Earl Hobbs of Layton, Utah, has a new idea for a meat pie. She has sold some of them to friends and neighbors who seem to like them very much. She has coined a word for the product. Do we think that she should get it patented?

You should check with your patent attorney on this. Although you might be able to register the trade name, others can concoct other names which will be as meaningless and equally non-descriptive. But the method of making the meat pie, and your proposed method of packaging it for sale, seems to us to be worthy of further investigation.

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Rome A. Schaffner of San Marino, Calif., sends drawings of his patent application for a device to prevent unauthorized persons from opening the hood of a car. Will we advise us to a company which would take it over on any equitable basis?

We are not impressed with this device which seems clumsy, troublesome to put on and take off, impracticable in inclement weather and a rather poor substitute for the cable hood latch or the hood lock found on many older cars. We feel that your one chance for a market is to make the device smaller, then get some stamping company to manufacture a small quantity for you and try to sell them yourself. You might as well face reality now instead of wasting much time and money trying to locate a manufacturer who will come to the same conclusions we did, but may not be as blunt in his criticisms. It is up to you to prove you have something worthwhile. •

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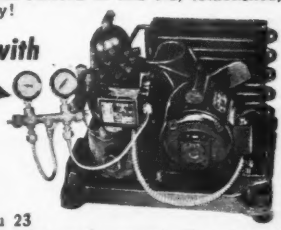

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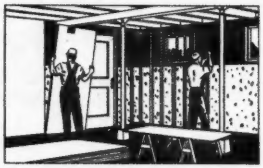

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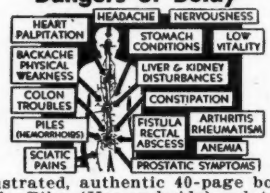

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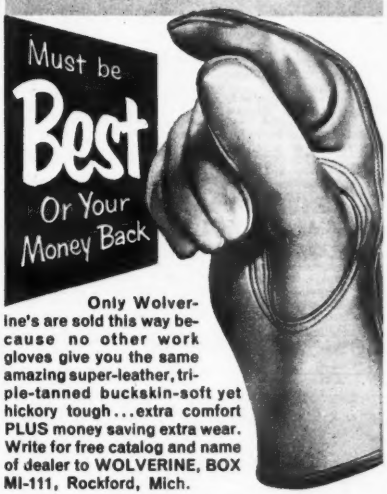

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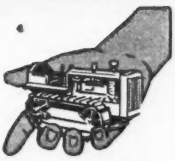

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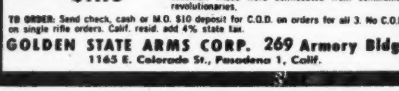

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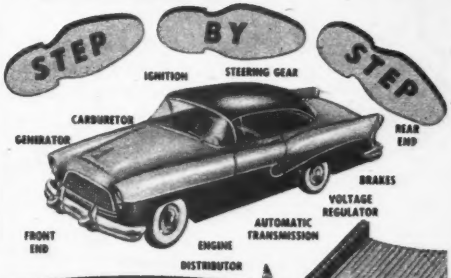

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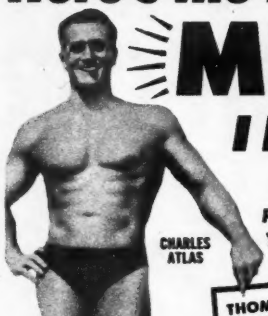

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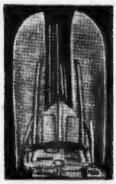

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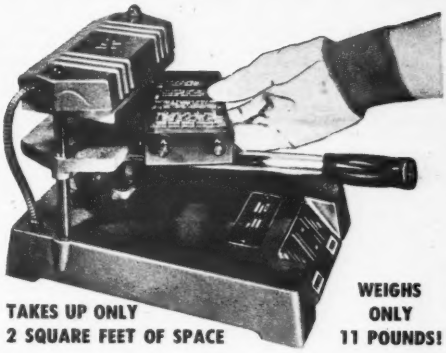

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12. HOW TO get the right price for the Rubber Stamps you make.
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RUBBER STAMP DIVISION
1512 Jarvis Ave., Dept. R-411, Chicago 26, Illinois

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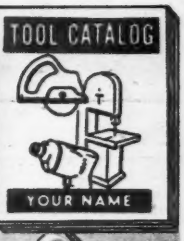

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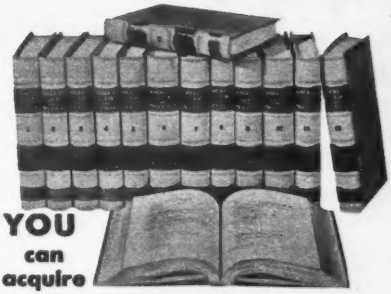

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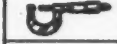

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This model is powerful enough to plainly show microscopic animal life in aquarium and pond water. Thousands are in use in high schools throughout the United States. This kit has been nationally advertised at $22.50.

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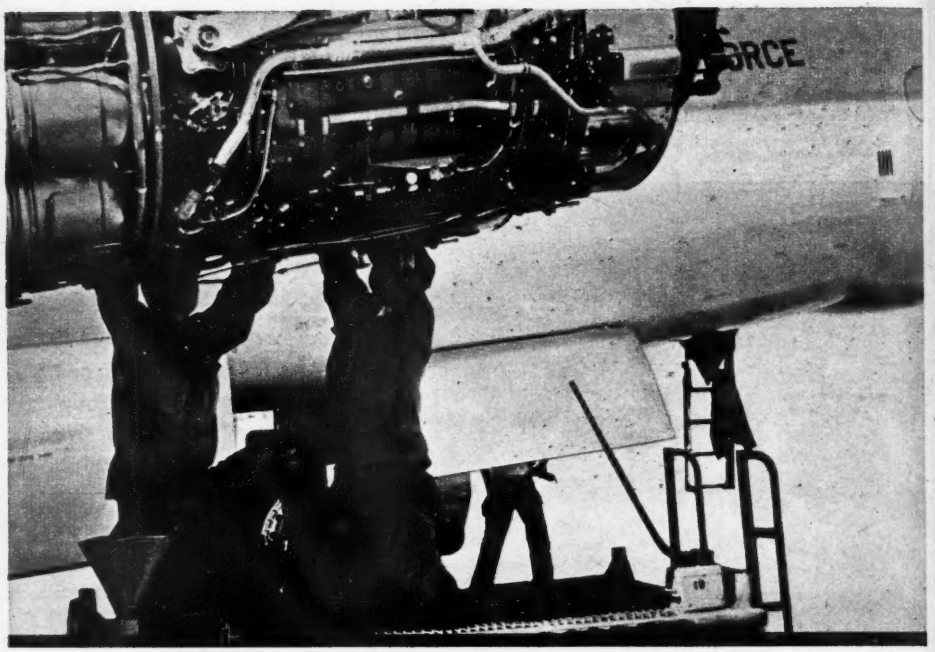

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ON THE HOT SEAT

SEATED on a fiery wicker chair in the 1200°F heat in the furnace of Seaporcel Metals, Inc. plant at Long Island City, N. Y., ceramic engineer D. J. Bennett wears new aluminum-coated fireproof suit. Makers claim suit will withstand temperatures one-eighth as hot as the sun. •

STRIKE IT RICH

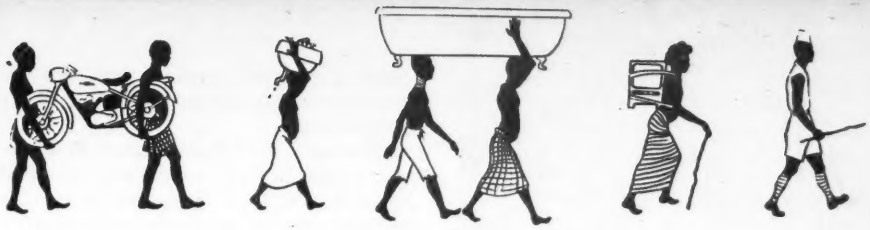
Cast a glance at the Bright Continent—"incomparably the best

THE YOUNG man knelt on the dry ground of the Bomi Hills in Liberia, a look of intense concentration on his tanned face. Then he rose and slowly made his way back to headquarters, deep in his own thoughts.

This was Lansdell K. Christie, a young American serving with the U. S. Army in Africa. During his off-duty hours, he would wander into the hills, combing the area for valuable minerals. Day after day he went out alone; finally he became convinced that a vast treasure in iron ore lay beneath the Liberian soil. The rest is history because Christie struck it rich out there. Eventually, the lone American got the Republic Steel Co. to invest in his Liberia Mining Co.; at last report he was hauling out a million tons of high grade ore a year.

The story of Lansdell Christie is just one of many about exciting goings-on in the new Africa. Toss away that phrase the "Dark Continent." In little

Thriving Capetown supermarket typifies the success of American business ideas in Africa.



IN AFRICA

By Lester David

source of potential wealth waiting development in the world."

more than a generation, the light of Western progress has shone into the Stone Age wilderness of many areas and now Africa, the untamed, is bustling with modern development. The sons of cannibals now mine the raw materials of the Atomic Age. And buy appliances from Sears-Roebuck!

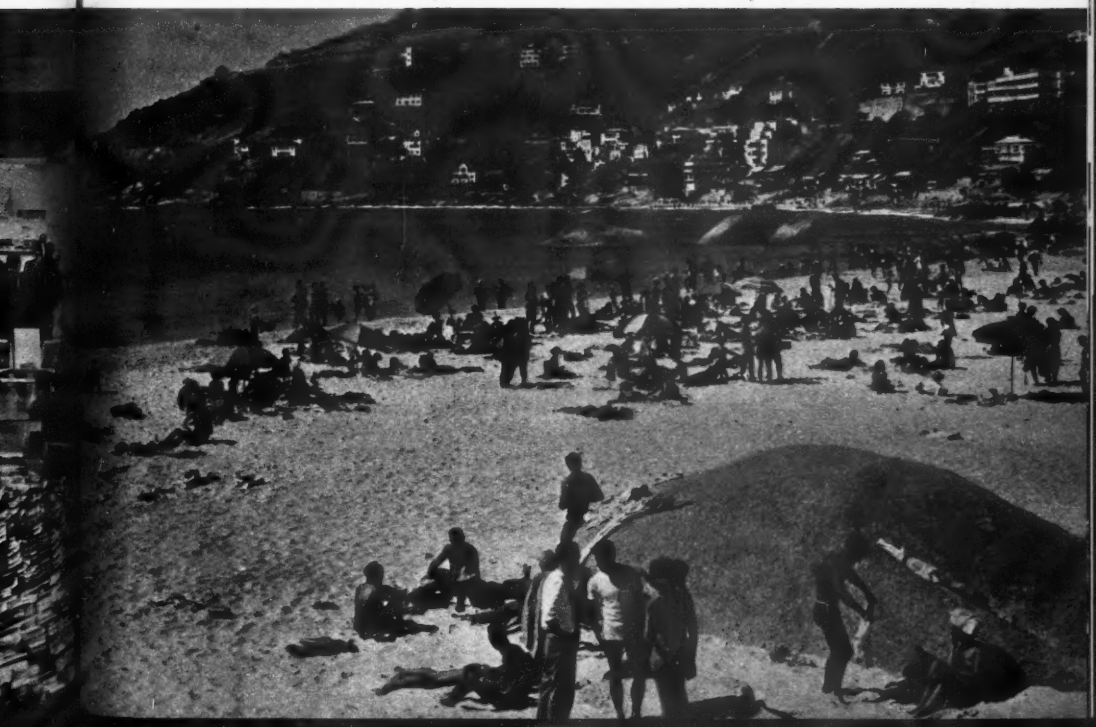
There are untapped riches in Africa the likes of which man has not yet seen. Africa has uranium, gold and silver. It has enormous deposits of coal, iron, manganese, chrome, copper, nickel, lead and antimony.

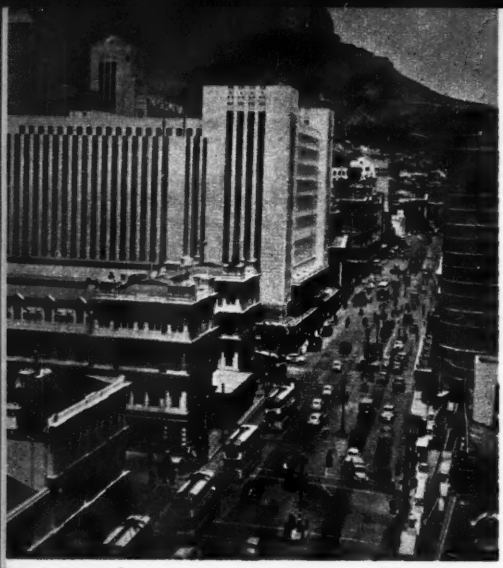
There are potential cotton empires to be carved out of the vast plains. There are coffee, tea and cocoa plantations which will go to the venturesome. There is a fantastic amount of virtually every kind of valuable timber.

Listen to what people who know have to say about the new Africa:

Item: John Gunther, the world-famous reporter, traveled 40,000 miles and

Developing Africa's playgrounds is big business in this era of increasing wealth and leisure.





Dramatically located Capetown is typical of the hustle and boom of Africa today.

visited 105 different localities to gather material for his monumental new work, Inside Africa. His conclusion: The continent "is incomparably the greatest potential source of wealth awaiting development in the world."

Item: "Boom hits the Congo," says U. S. News and World Report, the authoritative news journal. The Belgian Congo is "Africa's treasure house," says another investigator.

Who, besides the adventurous Mr. Christie, is pioneering down there? And who is cashing in on the little, and not-so-little, side businesses—providing consumer goods and services—which blossom when the economy of a nation starts burgeoning?

Kruger National Park is probably South Africa's most exciting tourist attraction.

Start with the tale of John T. Williamson, a tall, taciturn Canadian who had found his way to Tanganyika on the eastern coast in a search for diamonds.

Williamson searched the Tanganyika territory for four years. Finally, on a March day, his ancient automobile became mired in the muck. Williamson sighed, hunted up a team of horses, hitched them to the car and snapped the reins. The car was yanked out but the prospector's eyes stayed riveted on the deep slits the tires had made in the mud.

There were two large stones, the color of soapy glass. Williamson bent and reverently took them in his hands. It had begun to rain and water sluiced down his hat and into his boots but he didn't care. Williamson remained kneeling, the diamonds in his hands.

The adventurous Canadian had made his strike. It became the richest diamond mine in Tanganyika and it now sells more than $10,000,000 worth of gems each year.

Williamson, let's face it, was a rugged, wide-open-spaces kind of pioneer, as was Christie, but not all the new fortunes are being carved out the risky, adventurous way.

James A. Cavanaugh was an insurance salesman who figured he'd do a lot better in an area where there weren't too many other insurance salesmen around. Accordingly, he took a long, long trip through Northern and Southern Rhodesia, and at the end of his journey he added up the score:

Total number of insurance policies sold—597. Profit to James A. Cavanaugh—$200,000!

And the enterprising salesman was not the only one to whom this same general idea has occurred. Americans are now "discovering" Rhodesia with outstanding success, to wit:

Several have opened U. S.-style motels, complete with bars, restaurants and good service. They are fantastically successful. There are also a few drive-in movies, Yank-owned and coining money.

Americans are opening up barber

shops, service agencies of various kinds, small food emporiums, and doing fine.

In Central Africa, there is Bert Howard, a former G. I. who runs a thriving ostrich-feather export house.

Another American exports crocodile skins; still another buys and exports ivory. One of the most unusual exports from the continent is anti-snake bite serum; it's mighty profitable for the Nyasaland snake farmer who dreamed up the idea.

Success stories? You'll find them all over Africa. Emile Pagnon came to Morocco dead broke at the age of 32. Now he has 4,000 acres of the finest ranch land and is one of the wealthiest Europeans in the country. In the Congo an immigrant asked himself, "How about a resort for the folks who are getting rich here?" He scraped up money to start one: the Lido Pool at Elizabethville, which soon became a favored oasis for wealthy Europeans.

In Monrovia, capitol of Liberia, there is a local institution called the Pepper Bird. It's a combination restaurant, night club and assembly hall for government functions. It has African murals from Greenwich Village, N. Y., and a juke box that plays hill-billy music. It's owner? A barrel-chested Syrian-American from Brooklyn.

Interested? Then let's get to some basic info on how you can get there. First, about jobs for the guys who just want to get on the premises and then look about: two classes of jobs are available—those in U. S. Government work and those in private industry.

For government jobs, the ordinary civil service regulations do not apply as a general rule. The agency doing the hiring generally picks the people it wants without even consulting the Civil Service Commission.

To get a line on U. S. job opportunities in Africa write to Office of Personnel, Department of Agriculture, Washington 25, D. C., for the story on jobs for farm specialists; to Division of Personnel Management, Department of the Interior, Washington 25, D. C., for information on jobs in mining, waterpower development, fishery management, biology, geology, land management; to

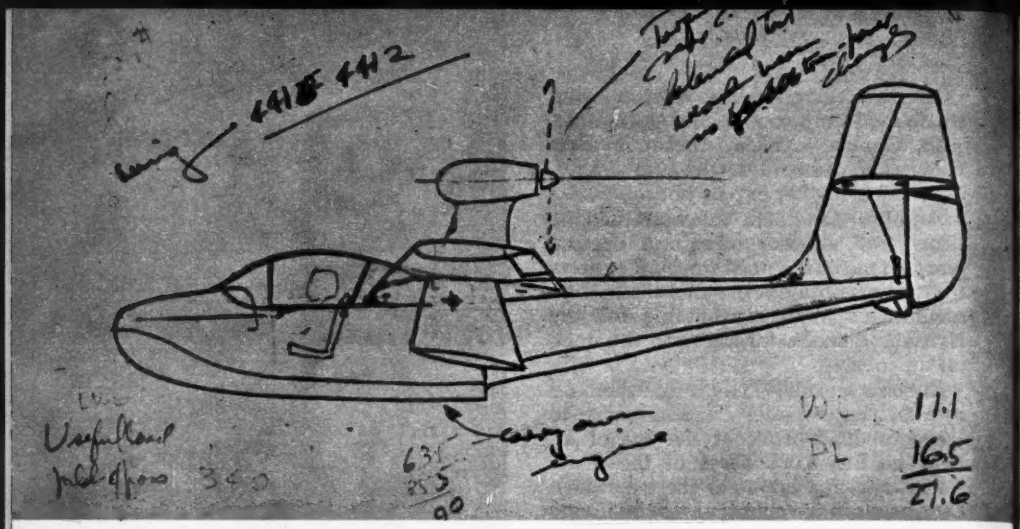
Authentic native weaving is one of many village products that might be exported.

Commander, U. S. Naval Activities, Port Lyautey, c/o Fleet Post Office, New York, N. Y., for the word on Navy jobs for civilians in French Morocco.

For general information send 15 cents to the Government Printing Office, Washington 25, D. C., for the booklet Federal Jobs Outside The Continental United States. You can also try the U. S. Employment Service, Washington 25, D. C.

For jobs in American industries in Africa, drop a line to the U. S. Chamber of Commerce in any country there and ask who's [*Continued on page* 175]

Rest huts or tourist cabins in the native manner; motels are increasingly popular.

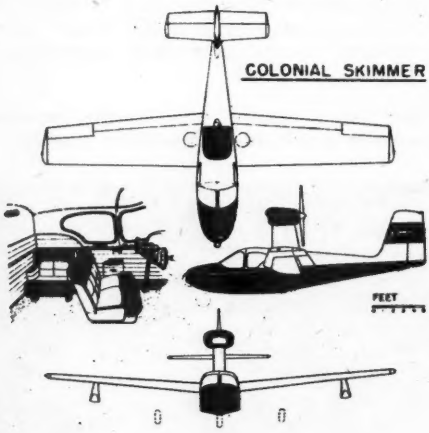


Thurston's first doodle of plane in 1945 looks amazingly like final production model.

GROWING PAINS OF A PLANE

It took 11 years to get the new Colonial Skimmer Amphibian off the drawing boards into the sky.

Initial plans of the Skimmer underwent plenty of changes before its completion.

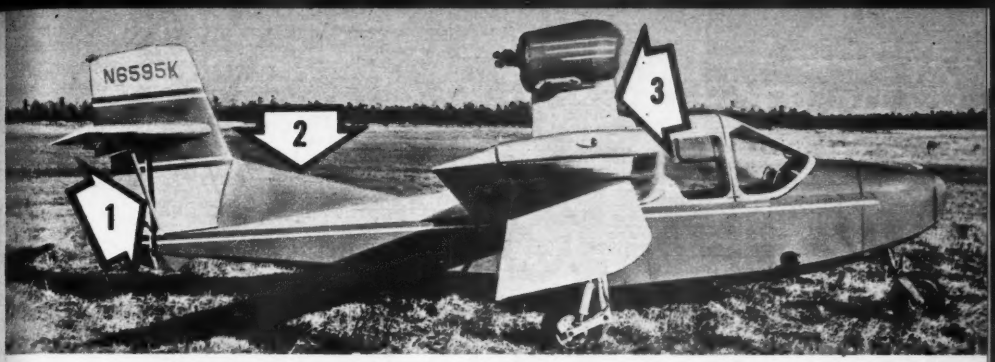


Photos by Howard Levy

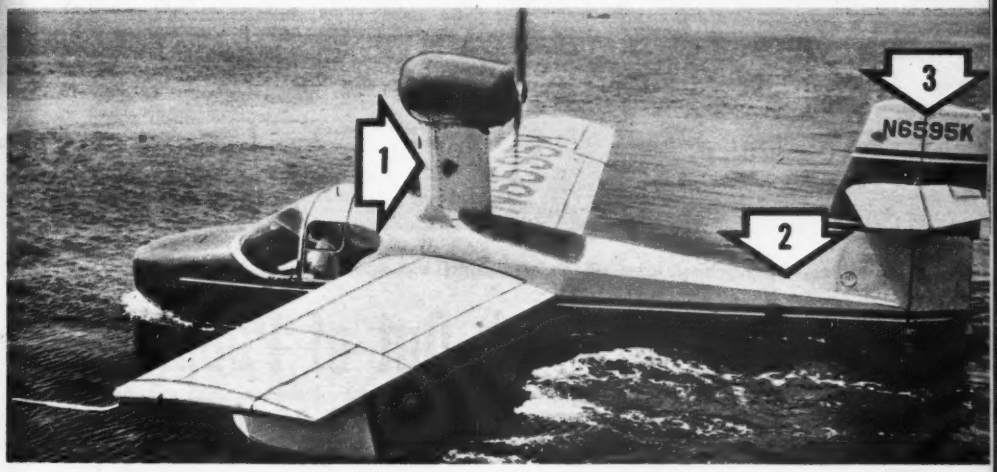
IT TAKES more than a pair of wings to get a plane off the ground and the new Colonial Skimmer Amphibian is a perfect example of the complications that plague designers from the initial plans until the ship takes to the air.

Back in 1945 David Thurston, a young aeronautical engineer, put down on paper his idea for a small, two-place amphibian. The first step was to design a ship capable of operation from both land and water yet have the plans conform to CAA regulations. It also had to have pleasing lines, be safe and give good performance. Cost had to be kept to a minimum, maintenance easy and operation simple.

Once flight tests began a myriad of changes had to be made in hull design, engine placement and a host of other infinite details. After nearly 11 years of work, the Skimmer was ready for production. The 1,400-lb. amphibian has a wingspan of 34 ft., a length of 24 ft., and a top speed of 127 mph. It will cost $15,750 with standard equipment. Ten planes are planned for 1956 in the company's new plant at Deer Park Airport in Long Island, N.Y. •

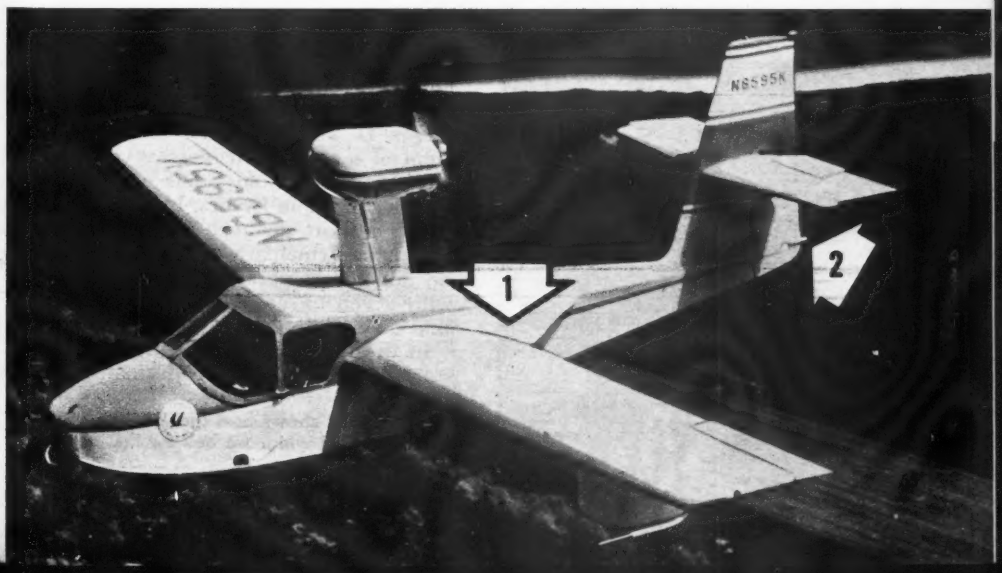


Prototype: 1. Elevator struts on tail. 2. High dorsal fins. 3. Short, thick engine pylon.



Later model: 1. Thinner pylon. 2. No dorsal fin. 3. Full-length tail rudder was added.

Production job has 150-hp Lycoming engine. 1. Wing fillet. 2. Elevator static balance.



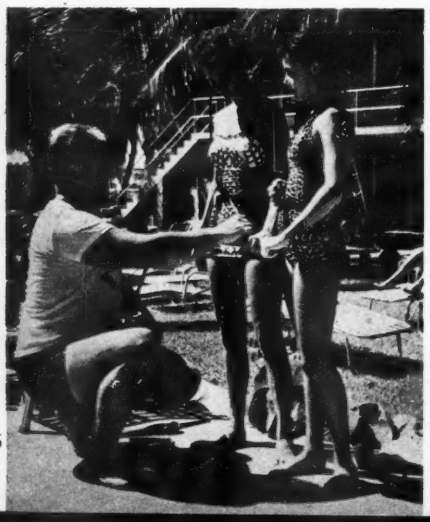
People Who Do Things

Skin divers from school take off on a fishing trip with spear guns for a little sport.

He Makes Fish Out of People

Ed Townsend's how-to skin diving school teaches aquatic enthusiasts to explore the briny deep safely.

By Sam Schneider



EARLY in the fall of 1953 two men set off on a skin diving prowl of the coral reefs in the ocean of Hillsborough, a tiny community on the southeast coast of Florida. The younger of the pair, wearing a brand new "lung" he'd recently bought, dropped off their boat and never surfaced alive.

The tragedy made headlines in south Florida, a climatically natural stronghold of the increasingly popular aquatic activity. It also spurred 260-pound Edwin D. Townsend into the development of a unique business.

Today 33-year-old Ed is owner and founder of Aqua Divers, Inc., in Hollywood, a short distance south of Hillsborough. Principal work performed by Ed and his helpers is to teach anyone with a yen to make like a fish how to skin dive—safely.

In the two-and-a-half years since he started his school for human sub-

Ed Townsend shows how quick release loop works to shed weighted belt for fast ascent.

Every student must be able to remove, then don outfit underwater before final checkout.

marines, Ed has taught 3,700 people how to use self-contained underwater diving equipment. Most of his graduates now skin dive for fun; a few have gone on to make it pay commercially.

Pupils at the school have ranged in age from 67-year-old Mrs. Alice B. Carpenter, of Port Washington, L. I., N. Y., to a six-year-old Florida miss. How well the elderly lady grasped the technique of skin diving was demonstrated by the fact that Ed took her on one of his periodic cruises to the Bahama Islands, not far from the U. S. mainland, for her "seminar."

In the great fishing grounds off Bimini, Ed watched closely while the graying Mrs. Carpenter splashed off the boat and submerged to 80 feet. She stayed down, exploring the bottom, for about 20 minutes. The thrill for both Ed and the lady was double, for Mrs. Carpenter is his mother.

A bosun's mate in the Coast Guard during World War II, Ed had been skin diving as a hobby for a few years prior to the Hillsborough drowning. Reading the news stories, he felt that no mechanical error was responsible. He asked to test the lung used by the victim.

With the police chief, Ed outboarded to the reefs. Strapping on the tank, and even donning the dead man's flippers and mask, Ed jumped in. He swam to a depth of 160 feet, paddled about a couple of minutes, then ascended slowly. The lung worked perfectly.

"I was prepared to testify at the coroner's inquest," Ed recalls, "that the poor fellow had most likely died because of a seizure of fear. I was convinced that not enough people know how to skin dive properly. It's a wonderful recreation and can be no more dangerous than a fast game of tennis—if the skin diver has the correct knowledge and is given the right training."

Panic is the worst possible thing for a skin diver, whether amateur or professional, deep in the astonishing water world. Townsend's course of skin diving instruction eliminates the factor of fright and thus permits the swimmer to enjoy in safety a genuinely exciting pastime.

Ed's course is uncomplicated. MI readers who wish to learn how to skin dive will find it easy to follow.

Lining his pupils up at the side of

Dressed in full skin diving regalia, this comely lady is ready for her first lesson.

the pool, the burly teacher hands each a web belt strung with round weights. The belt is strapped about the waist with the weights at the small of the back. The belt is passed through two metal loops rather than a buckle, and the end of the belt is then folded back under one loop to form a half bow. The free end of the belt, when pulled sharply, causes the half bow to slip back through the metal loop and presto! the whole belt falls off. This is called a quick release loop.

The weight about the midsection is necessary, Ed explains, to trim the diver to neutral buoyancy. Without it, the body will rise in the water.

Next comes the rubber mask with its glass faceplate. This article he takes in both hands and flanges out the corners with thumb and forefinger. Applying the mask to the face, he shows that the top runs across the forehead at about the hairline, while the bottom rests on the upper lip just under the nose.

The glass plate is held firmly with one hand, while with the other he fingers the circumference of the rubber rim to be certain it isn't caved in anywhere and thus admit water. The strap is then adjusted over the head.

These articles should be handled quickly, familiarly, Ed stresses. The class is requested to repeat donning the belt with its quick release loop, and the mask, several times.

Frogmen's flippers are placed on everyone's feet. Townsend orders the masked, weighted pupils into the pool, instructing them to use only the feet for propulsion. "You must forget the habit of breathing through the nose," he counsels. "The mouth does all the work now."

For those who fear they will sink because of the weights, Townsend swims into the deepest part of the pool, takes a deep breath and ducks under. His motionless body rises and emerges from the water. Then, he flaps his flippered feet gently and treading water, holds his head above the surface with ease.

The psychological effect of this demonstration is always strong. Convinced it's easier to stay air-side than water-side, the pupils emulate the master. After a few tries, Ed instructs the class in making surface dives. Though non-swimmers usually find this difficult in the beginning, the important thing is that Ed has already removed much of their fear of the water.

"Now, take a deep breath," he says, "surface dive to the bottom of the pool and sit there for about 15 seconds. It will relax you."

A floundering, splashing derriere-display occurs as pupils up-end and dive down. Townsend accompanies them to the bottom, swimming from one to the other and nudging them gently until all are seated. Whether the students realize it or not, they are acquiring control over their breathing and propulsion under water. This is part of the confidence-buildup the would-be diver needs.

Masks are left on while Townsend begins fitting the lungs. His purpose is to continue the swimmers in the habit of mouth-breathing, to accustom them to the mask.

Shoulder straps, also of web belt, are tied across the chest with the identical quick release loop as the weighted belt; belly straps girdling the waist are adjusted in the same manner.

The rubber mouthpiece at the center of the U-shaped breathing tube connected to the air tank's regulator is placed in the mouth. The lips are put

over a flange and the student bites on two good-sized "teeth" protruding from the bit (between the rubber teeth is the hole from which air is drawn). Gripping the mouthpiece in this fashion insures the breathing tube will be watertight at the mouth.

Ed explains that the compressed air from the 40-pound metal tank comes in via the right hand tube, and the breath is expelled forcibly out the left tube, through a flapper valve, in the regulator. Inhaling and exhaling is accomplished through the mouthpiece. The regulator operates on demand—one must suck in air forcibly when it's needed; it does not supply a constant flow.

"Should water get into the breathing tube, you can either swallow it—definitely not recommended—or blow it out through the flapper valve," Ed says. He demonstrates the latter procedure by ducking his head under the water with the mouthpiece out and allowing it to fill up.

Above water, he reinserts the mouthpiece, then leans sidewards to the left. The water in the tube, seeking the lowest level, goes into the left tube. Using a rolling motion, he tilts himself backward and blows sharply through the mouthpiece causing the water in the tube to spray out of the flapper valve.

Students try it on the surface, performing the sideward-backward sway with a tubeful of water until each clears the breathing device successfully. In the shallow end of the pool, with the class on its hands and knees, the process is repeated.

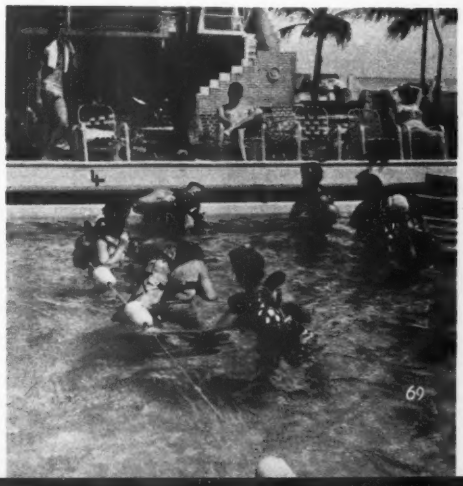
"The depth of the water doesn't matter," Ed says. "The tube can be cleared wherever you may be skin diving."

Should the mask, too, become filled with water, the method of draining it while submerged is also accomplished easily. Ed scoops up a maskful and claps it over his face. Slowly, he tilts his head to the left and rolls back so the left hand corner of the mask is down. With his right hand, he presses the palm softly against the right corner (the uppermost side of the mask now). At the same time, he snorts sharply through his nose. [*Continued on page* 188]

Townsend thoroughly checks each student's equipment before the first dive is made.

Here Townsend demonstrates proper method for hitting water from gunwale of a boat.

Leaning sidewards, Townsend shows how to blow out water in breathing tube via valve.



In the basement of Ohio home the Warthers clean and hone a batch of quality knives.

One-Man Knife Factory

He was only six when he got his big idea—but it's still paying off.

By George Laycock

DAVE WARTHER, who makes what many people think are the world's finest kitchen knives in his Dover, Ohio, shop is a man whose career is living proof that in this age of mass production there is room for fine craftsmanship.

Dave, who is now 30, started making knives for profit when he was six years old. In the garden behind his family's big brick house in Dover, Dave's father Ernest, a world-

Fine steel, razor edges and top workmanship put his knives among world's finest.

Dave proves his point—or, better, his edge—by shaving with one of his cleavers.

famous carver of model railroad engines, has a small shop.

"Dave was only six," says Ernest Warther, "when he came into the door of my shop one day and said, 'Pop, I'm going to do like you do. I'm going to make things and sell them and save the money and when I grow up get married and build a home."

His father asked him when he wanted to start. "Right now," Dave replied. The elder Warther broke a hack saw blade in half and gave a piece of it to Dave. The boy ground a primitive knife blade from it, fashioned two pieces of wood on it for a handle and dashed out of the shop with commercial intentions.

He returned in a few minutes. A neighbor had given him two cents for the knife. He made a second knife from the other half of the blade and dashed out and sold it to another neighbor for a nickel.

Dave continued to make paring knives. When he was eight years old he tackled a bigger project, a hunting knife. He fitted it with bone handles and a sheath and was wearing it on his belt one day when a train stopped on the siding down behind the house. The conductor saw the knife and said, "Kid, where'd you get that knife?"

Grinding by hand: this is how a blank of high-temper steel becomes a knife blade.

Micrometer shows blade edge to be between zero and one five-thousandth of an inch.

"I made it," Dave replied. He added that he would make another one just like it for $2.50. When the train came back through, Dave had his hunting knife ready. Then the conductor ordered a set of kitchen knives. This brought other orders. The trainman showed young Dave's knives in eating places along the railroad and by the time Dave was in high school he had sold knives to most of the beaneries from Wheeling to Lorain. And he's been making knives ever since.

He points out that his knives have blades made of harder steel and are thinner than any other knives on the market, and the steel extends all the way through the handle. All of his knives have laminated handles made of resin-treated birch, so hard they must be worked with carbon tipped tools.

His biggest sellers are his paring knives, steak knives and butcher knives. He gets $1.60 retail for paring knives. Steak knives bring him about $2.00 each, and the walnut case for a set of eight about doubles the price of the set.

What are the steps in making a knife? "First," Dave says, "the steel is blanked out. We use a high carbon chrome steel." Next the steel is hardened. He sends boxes of his blades in the rough to one of the country's best heat treating plants for hardening. Back in the shop the blades are ground down; Dave uses a micrometer to measure the cutting edges. He gets them sharp enough to shave with.

Then the blades are polished and the handle is added and the whole thing buffed and cleaned. The Warther name is etched into the steel blade with acid; then Dave hones each knife by hand on a whetstone. After that they're packed in sets with carefully matched handles and made ready for shipment.

Dave has a number of tips on caring for knives. His first rule is to keep the knives in a holder rather than an open drawer where they bump and rub against other hardware.

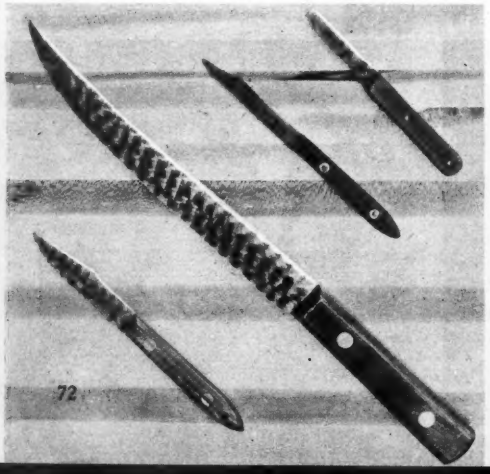
And you should use your knives on a cutting board. One of Dave's pet peeves is that too many women cut foods right in an iron skillet. "I just hate to think what's happening to my cutting edges," he says.

One final bit of advice: hone the knife when it needs it. Dave insists that a properly made knife doesn't need grinding. A few times over a whetstone should be enough to put a good edge back on it.

It stands to reason that Dave would get orders occasionally for unusual knives, or as he calls them, "freaks." One army officer during World War II ordered a commando knife complete with knuckles and spike in the handle. Every once in a while a customer who has worn a paring knife down thin will order another "worn out" knife already ground down.

"But I always try to stay clear of the freak knives," Dave says. "All I want to do is to make a good knife." •

Warther knives, early and modern. One at right was his first, sold for two cents.

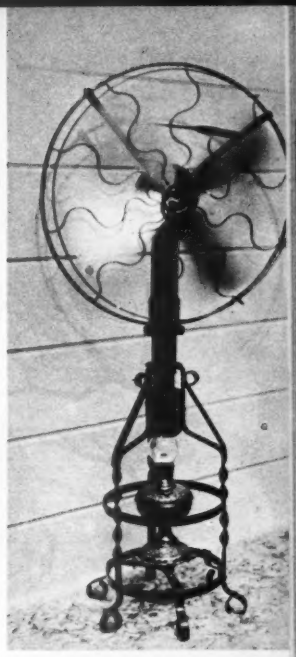


Dave set up in business in this building while in grade school, is still using it.

In his Tampa home Earl Cross makes good use of his mysterious antique.

HOW DOES IT WORK ?

EARL CROSS doesn't know what makes his antique rotary fan work—but why argue with a cooling breeze? In the base of the fan is an oil lamp which heats a cylinder containing two pistons. Light the lamp and the blades slowly pick up speed. The fans were part of a shipment made up for a long forgotten African hunting expedition. •



Can anyone tell us how the thing operates?

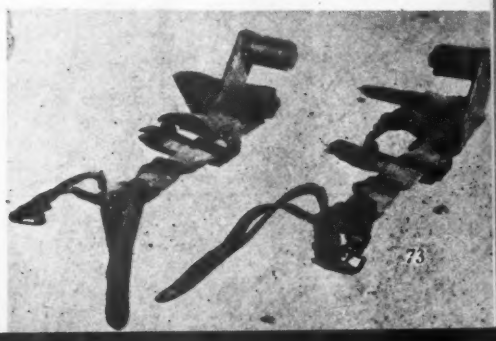
WALKING ON AIR

Structural steel painter goes up and down columns on roller skates.

Rollers brace against H-column's flange when foot presses down.

Painter Teddy Colaluca uses no safety equipment but his curious roller skates.

Leather straps fasten the skates to painter's feet. Flange goes between rollers.



TALL

Tales of Texas

The wind blew and the myths flew in these Lone Star State stories.

By J. Frank Dobie

ONE Texas claim is that it does not have a climate—just weather. Lone Star Staters boast of the "west Texas wind gauge"—a log chain fastened to a post. If the wind lifts the chain and blows it straight out, it's a hard wind.

They tell of a new-comer who noticed a man hunkered down beside some house blocks without any house.

"You live here?" the newcomer asked.

"Yep."

"What happened to the house?"

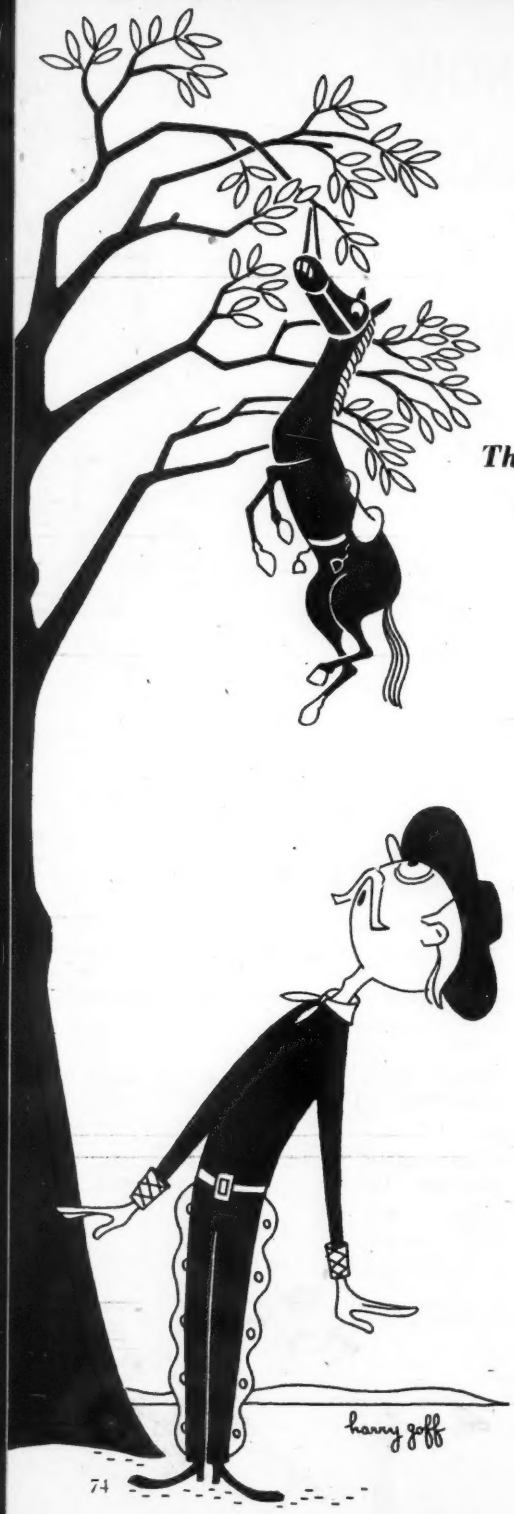
"Blew away."

"Anybody hurt?"

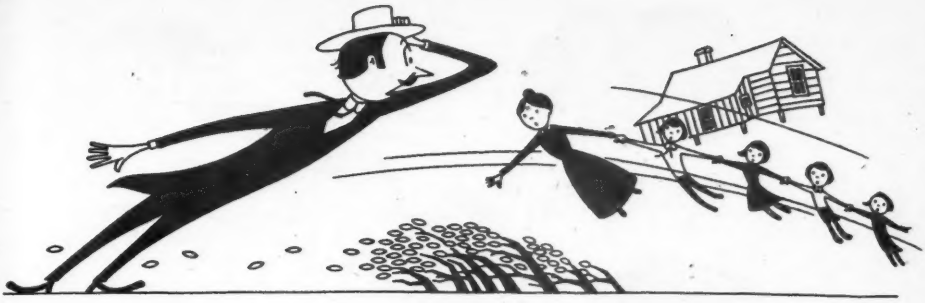
"Can't say yet. Wife and four kids blew away too."

"Great Scott, man! It seems to me you'd be out looking for them."

"Now quiet yourself, stranger. If you had been in this country as long as I have, you wouldn't get so het-up. The wind's already shifted around and I figger I might jest as well wait fer it to blow the old woman and the kids back. If I took after 'em, I'd be liable to miss 'em. No, you don't understand about this here wind. Why, not long ago Jim Harper lost his hat in it. Jest five days later danged if the wind didn't



The cowboy staked his horse to a twig one night and the next morning found him hanging from a cottonwood tree 60 feet high.



He saw a woman flying toward him with her skirts spread out and four urchins hanging on.

change and lodge that hat right in Jim's own woodpile."

The newcomer was interested. "Say, how far do you suppose that hat traveled before it started back?"

"Well, it traveled jest as far coming back as it did going out. Mister, I guess you can figger distances as well as I can."

The newcomer was figuring when, glancing to the north, he saw a woman flying toward him with her skirts spread out and four urchins hanging on.

"Well, by gravy, old woman," the householder said as she lit, "you got back a little sooner than I was expecting."

The stranger went on to El Paso and got into a Shriner convention. It was March and the wind-driven sand was so dense that a driver couldn't see past the radiator of his own car. When the president of the chamber of commerce got up he apologized for the weather. He concluded by introducing Captain Jim Gillet, who had come to El Paso when it was just a campyard.

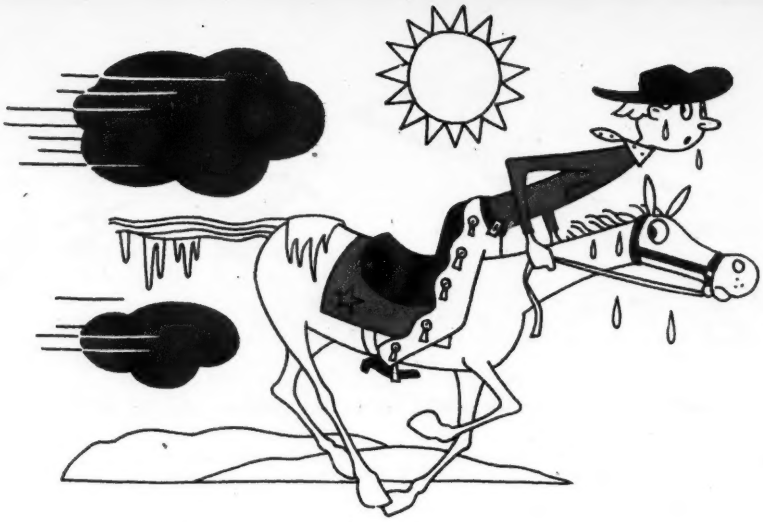
He began, "I came to El Paso in 1879. They were having sand storms then and they have been having them ever since, but here lately it seems like the wind has sorter lost its strength. I remember one time we were riding in with a pack mule.

"As we rode along through the sand hills between Ft. Hancock and El Paso, I noticed the mule shy, and then the lead ranger stopped. He was right over the crown of a man's hat sticking out of the sand. It looked like a new hat and when the ranger got down to dig it out, the rest of us stopped to watch.

"Well, sir, when he uncovered the brim and went to lift the hat up, he discovered a man's head inside it. We got down and worked carefully with our fingers to scratch the sand out of the man's ears and eyes and mouth and nostrils. He gave a little cough and said,

Condensed from Tales Of Old-Time Texas by J. Frank Dobie, published by Little, Brown & Co. Copyright 1955 by author.

"Get a shovel. There's a good horse under me," he said, when the ranger picked up the hat.



The front end of the mare was steaming but her hindquarters were nipped by the norther.

'Get a shovel. There's a good horse under me.' "

Jack Helms did not live within 50 miles of a cottonwood or any other kind of wood except the roots of a switch mesquite. His ranch was in a country where it takes 50 acres to run a barren cow.

One summer, though, it rained several times and cattle were a good price. It certainly looked as if Jack Helms' ship was coming in and he had no trouble getting his note extended at the bank.

After the papers were signed the banker asked, "What are you going to do, Mr. Helms, when you sell this fall and have all your money?"

"Everybody in this country knows the only real shade a man ever finds to take a nap in is under a wagon. Half the time mine is in use. When I sell my yearlings I'm a-going to buy a new wagon that won't have a derned thing to do but supply shade for my nap every day."

One of the most noted characters of deep Texas—the Texas of piney woods and sorghum molasses—was Mr. Fishback of the Sulphers. Fishback Lake in Titus County preserves his name, as does many a story of his race horses and coon dogs. On a certain delightfully mild, sun-blessed winter morning, Mr. Fishback set out on his fastest mare to ride from Clarksville to his cabin on Fishback Lake, 20 miles south.

He had traveled about half the distance when he happened to look back and see a gen-u-wine blue norther swooping down. It wasn't blue; it was black. In a second or two he felt the light breath that always runs ahead of the mighty blizzard. This was before the days of slickers but Mr. Fishback had a good long-tailed overcoat tied behind his saddle. Without stopping, he jerked the saddle strings loose and put on the coat but left it unbuttoned.

His mare needed no urging. She was the fastest thing known in Texas before Sam Bass's "Denton mare" arrived long afterwards. But no race animal can run at top speed for ten miles.

Mr. Fishback held his racer down, intending to save her best running for the final lap.

Before long, he looked back again and saw the norther twisting the mare's outstretched tail. He heard the roar of the great wind. He felt a fleck of sleet on his face. He slacked the reins a fraction and the mare spurted ahead.

For six miles, Mr. Fishback used to swear, they kept exactly even with the howling, sleet-laden norther. That is, the front end of the norther was enveloping the mare's hindquarters, shoving her along at the same time.

Meanwhile the mare's foreparts and his face kept ahead of the norther.

He had a stable for this fine mare. He rushed in, got down and looked at the noble creature that had made such a race. Her forequarters were in a lather, but the muscles of her hind legs and all the rear parts of her body were frozen stiff. Within 30 minutes she was in the fever of pneumonia, and before daylight she was dead.

It was down in Nueces country that a certain rancher who was better at raising children than calves went out one September night and began throwing handfuls of pebbles on the roof. His wife ran out and asked him what in the world he was doing.

"Why," he said, "it's lightning in the west and might rain. This drouth has got to end sometimes. That's certain. I thought it would be a good idear to kinder break the kids into hearing something fall on the roof. Then if it ever actually rains, they won't stampede."

A stranger rode into Tahoka and fell in with two old-timers named Jack Potter and Prairie Dog Dave who were talking about big winds.

"One year," said Prairie Dog Dave, "I was trying to farm a little down towards Midland. I raised a pretty good crop. I had a good corn crib and it was chock full of corn—corn in the shuck.

"On the west side was a little window kept open for ventilation; the east wall had a knot-hole about the diameter of a good-sized corn cob. The roof was raised about three inches above the top of the wall.

"You recollect that wind came up along late in the evening and blowed fierce all night. Next morning I went down to the crib to look around. Over on the east side I noticed a line of fresh corn cobs strung out far as I could see.

"I looked inside the crib. Well, sir, it was five feet deep with shelled corn and not a shuck or cob in sight. You see, that wind blowing in through the window on the west side would twirl the ears of corn around and snatch off the shucks.

"After the ears were shucked the wind went to blowing them endwise into that knot-hole. It was better than a corn-sheller. The cob couldn't get through until all the grains were shelled off. I trailed that line of cobs 11 miles east of the knot-hole in my crib. It was wonderful how straight the line was. I don't know how much farther the cobs would have been carried if they hadn't struck a line of telegraph poles."

All this time the stranger had not said a word. "Gentlemen," he now said, "from the wind I myself have experienced in Texas I can well believe you.

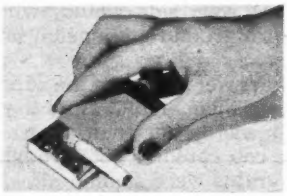
"And I want to thank you for not telling me about the cowboy who staked his horse to a twig one night and the next morning found him hanging from a cottonwood tree 60 feet high. You two have avoided such matters of common knowledge and given me fresh facts.

"So long." •

"I'm going to buy a wagon that won't have a thing to do but supply shade for my nap."

He threw handfuls of pebbles on the roof so the kids wouldn't stampede if it rained.

This Month's BRIGHT IDEA



Pocket lighter held by charming model, above, has slide-out ashtray, left.

Pocket Ashtray-Lighter

A GUARANTEED conversation-starter wherever you go is this unusual German-made Simpson cigarette lighter which copped top honors for this month's Bright Idea. A pocket ashtray and lighter, this smoker's accessory is no larger than an ordinary lighter. A flick of the thumb at light-up time and the flame is ignited. Then you pull the slide-out ashtray from the base and you don't have to worry about dumping ashes on your host's rug when he isn't looking. The Simpson comes in pigskin ($7.50) or alligator ($11.50) and can be obtained from Camalier & Buckley, 1141 Connecticut Ave., Wash., D. C.

WIN $50

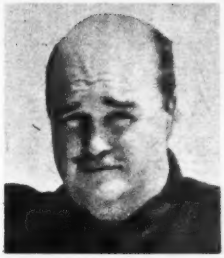
Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to the Bright Ideas Editor, Mechanix Illustrated, 67 West 44 St., New York 36, N. Y. Each month the best entry gets a cash prize of $50.

Simpson lights as a lighter should—a flick of the thumb and it's time-out for a smoke.

No problem with ashes. Simply slide out the ashtray and dump them later, when party's over.

Imported from Germany, Simpson is no larger than usual pocket lighter and well made.

COVER STORY



McCahill Previews the '57 Cars

By Tom McCahill

HAVING seen photos of all the 1957 models, and having tested some of them, I feel safe in stating that '57 will be the year Detroit shoots its biggest arrow in an effort to reverse the drooping sales trend of '56.

These new models show the wildest departure from traditional styling ever attempted and if this doesn't touch off a correspondingly wild buying spree, there will be a lot of red faces, red ink and pink slips in southeastern Michigan. Unfortunately we cannot at this time publish all the photos or information we have about new models because release dates have to be honored and some models won't be unveiled to the palpitating public until after this issue hits the stands. But let's get rolling on what we've got.

The 1957 CHRYSLER New Yorker will be top dog of the Chrysler line—the Imperial being a separate make. Last year's Flite Sweep fenders have been jacked up another notch or two so that even when the car's parked it looks like it's going. Style-wise, the changes are not as drastic as those found in the Imperial but the changes are there, nevertheless. The 126-in. wheelbase is the same as '56 but the overall length has been carved two inches to 219. The width has been shaved and the height dropped three inches. Like most '57 cars, it features a flared-out tail line which, believe it or not, has a stabilizing effect. Windshields are 40 per cent larger and the hardware has been reworked for safety. Dual headlights are optional where legal. (continued)

PLYMOUTH

The New Yorker will have the three-speed forward push-button shift introduced late in '56 on the Imperial. This should immensely increase acceleration and passing ability which certainly weren't backward on the older model. In 1956 the Chrysler New Yorker could easily out-perform its two closest competitors. This year, with its new engine, it should be able to continue to do this as easily as you'd accept a pay raise.

Torsion bars are utilized in front for better stability and to retard brake dip. The height of the two-door hardtop is down to 56 inches, a four-inch drop from last year, making it a nice height to serve as a writing table for cops giving you tickets. Keep your eye on these cars at Speed Week this year in the family car division.

The 1957 PLYMOUTH sports a 301-cu. in. engine which is exactly the same size as the Plymouth Fury we tested in the September issue. Plymouth, like all Chrysler products for '57, has the upsweep fender line similar in profile to the '56 Cadillac Eldorado. The wheelbase is now a standard 118 in. and the tread has been widened while the height has been reduced by almost three inches. This should make the Plymouth as stable as a steamroller in a two-mile breeze.

The front end treatment is quite foreign in appearance and has the same four-front-light set-up (two driving and two direction indicators) found in the Dodge. The '57 Plymouth, like all Chrysler cars this year, has the rearview mirror mounted atop the instrument panel instead of hanging from the rafters as of old. The front torsion bar suspension should make this a tough one to beat on the stock car circuit. In fact, the '57 model looks like the most car for the dough ever sold by Plymouth. I'm anxious to test it and bring you a fuller report later.

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The DODGE for 1957 has undergone a radical styling change. The rear fender line, which is broken just short of full astern, with tail, back-up and stop lights below, resembles a product of the White Sands or guided missile school of design. From a head-on view the Dodge seems to be carrying four headlights, though two are smaller for parking or city driving.

The bumpers appear massive and as rigid as a Supreme Court decision. The fender line in front has been flattened out and the windshield area has been upped. The displacement has been raised to 325 cu. in. which is a ten-inch increase over the largest Dodge engine of '56. The wheelbase has been increased two inches to 122 and the width has swollen three inches to 77.9. The height has been dropped more than three inches.

I haven't had a chance to drive a '57 Dodge yet but my '56 Dodge station wagon is one of the easiest-handling cars I've ever driven and I hope this hasn't been altered.

If there was ever a finer looking car built in this country than the 1956 IMPERIAL you'd have to trek a long way to find it. From a performance standpoint it could outrun any of the other fine cars in either breaking away from a traffic light or screaming across the Texas plains. With air-conditioning this car approached the lushness of a Moroccan harem—or to put it another way, Chumley, this was a gentleman's car, not intended for the pushcart set.

However, time, tide and Lizzie Glutz wait for no man, so for 1957 we have an entirely new Imperial that looks as chic as a Paris salon. Powered by the largest engine made in the passenger car world, 392 cubic inches, this (continued)

IMPERIAL

job will get down the pike like a Vaselined arrow and with no more effort than skipping off a cliff. Style-wise, the new Imperial resembles the old one about as much as Clark Gable resembles Buddy Hackett. The front fenders have been flattened and the trunk lid can be had with an extra-cost Continental-type tire outline on it.

In the facts-and-figures department, the wheelbase of the '57 Imperial is down four inches from last year's and the overall length is shortened by 5.2 inches, so maybe the make-'em-longer trend in American cars has finally ended. The make-'em-lower trend, however, is still going strong and the '57 Imperial will have a full three inches less height than the '56 and is 2.4 inches wider. The hardtops will be lower by five inches and dual headlights will be optional on this series in states where the gendarmes allow them.

After looking at this new Imperial I'm beginning to get a nostalgic feeling about my '56 job and am wondering where to rustle up enough loot for a changeover so that I won't feel like I'm wearing a celluloid collar and high button shoes. At that, I'm in better shape than that well-known fiddle player named P. Whiteman who, after seeing and riding in my rig, bought a '56 Imperial just a month ago! He flipped what is left of his wig when he saw the '57 job and if I'd been an Imperial salesman he would have signed the order blank right then and there. Frankly, I'm going to miss the old sparrow-trainer tail lights but I'm happy to say my old pal, Herman the Coot, is still in jump position on the hood. (This is the forward ornament on the bonnet, not visible from the driver's seat.—*Ed.*) All in all, this '57 Imperial is the most spectacular-looking new car to date.

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IF anybody looked up the HUDSON and its sister ship, the Nash, in the book filled with little figures they might get a bit confused about which was which. These two cars are as alike as those curly-haired twins named Toni. There are differences styling-wise but the size and shape are just about the same.

Major change in the body this year is a drop of two inches in the height, down to 60.25 inches. The wheelbase, 121.25 inches, and the overall length, 209.25 inches, are the same. You can add an even ten inches to the length if you want to include the spare tire mount. The Hornet comes out with 14-inch wheels and a hopped-up engine, however. Last year's power plant was a 250-cubic-inch job that put out 190 horsepower. That mill has now been passed on to the Rambler and the reworked Hudson V8 has a displacement of 327 cubic inches. The bore has been swelled to 4 inches from 3.50; the stroke of 3.25 inches is the same. This new grinder develops 255 hp at 4,700 rpm and is rated at 345 foot pounds at 2,600 rpm. The compression ratio is 9 to 1.

In looks, the Hudson has undergone a face-lift job that cracks you on the noggin with what American Motors calls its V-line styling. Both the bottom and top of the grille form V's, a big V has been added in the middle of the grille and the chrome strips dip into a V on each front fender right under a new V8 emblem. Maybe AMC is thinking about V-for-victory in 1957? The tail fins have been heisted slightly in the new model. The styling do-dads over the headlights look like they might have got greased by a stray 30-06 slug. Where there used to be only one per light, we now find a split-tail job with two points. (continued)

NASH

THE NASH Ambassador, like the Hudson and Rambler, still maintains its symmetrical, no-flying-allowed fender lines for 1957. The Ambassador, once a hell-for-leather road competition rig, does not reflect the changes found in the Big Three this year. One big change in appearance is the four-eye look—dual headlights. And, unlike some other twin-headlight models, the four lamps are standard equipment on the Ambassador, not optional and extra. Only two of the lights are lit when you're driving on dims but when you press the button out in the country you get the full power of four headlights. Dual lights are legal in only part of the states, however, and some of the others have shown signs of being a little sticky on the point.

The Ambassador is powered by a V8 mill with a 327-cubic-inch displacement developing 255 hp at 4,700 rpm and 345 foot pounds of torque at 2,600 rpm. These figures are all the same as the Hudson's. Going right down the same furrow as the last page, the Nash's wheelbase is 121.25 inches, the overall length is 219.25 inches (with tire mount), the width is 78 inches and the height is 60.25 inches, two inches shorter than last year. The car has a 20-gallon gasoline tank and a turning diameter of 42 feet. The 1957 model comes with 14-inch wheels and the Hydramatic transmission. Or it can be bought with synchromesh and overdrive. The Ambassador also has gone in for the V business. A big V has been added below the emblem smack in the middle of the grille. The grille itself has something of a new look. Instead of the straight up-and-down bars, it has a smaller rectangular mesh effect with the horizontal bars dominating. The parking lights, once just outside the headlamps, are now perched up on top of the fenders. Nash continues to offer its reclining seats and bed as optional equipment.

foot pounds of torque at 2,600 rpm. These figures are all

offer its reclining seats and bed as optional equipment.

LIKE the Ambassador, the RAMBLER still has the rounded fender line and is very similar in appearance to last year's model. The Rambler name used to come attached either to Hudson or Nash, but now the front part has been dropped and the Rambler name stands alone. The line has both sedans and station wagons but the wagon seems to be carrying the coal.

Biggest change this year is a hardtop effect on the wagon that Rambler has pulled off by knocking out the post. The man with the hammer definitely added something to the looks. So has a new type of paint job. The strip covering the window frames now goes all the way to the back. Last year those small windows over the back wheels were outlined in a different color and you got the idea that the back part might have been added as an afterthought.

The Rambler comes with a six or a V8 engine. The eight is new to the Rambler line, being the one presented gratis to it by Hudson. It is a 250-cubic-inch job turning out 190 hp at 4,900 rpm with a torque of 240 foot pounds at 2,500 rpm. When you compare this with the six that made the model so popular and now sports 125 hp with 175 lbs. of torque, this new V8 wagon should be quite a rig for hustling a keg of suds to a fireman's clambake. It comes in a multitude of available transmission combinations, including Hydramatic, synchromesh and overdrive.

As I was the first man ever to test or drive a Rambler (aside from factory engineers) many years ago, I've always had a soft spot in my heart for this little bucket. Performance-wise, I can't make any firm predictions until I give this car a thorough testing. (Continued)

CHEVROLET

YOU can't tell it from the outside but under its hood the 1957 CHEVROLET is carrying the biggest news in the automobile world this year—fuel injection. This gadget, which is optional and extra, replaces the carburetor and takes over the job of supplying gasoline to the engine. On the market, it should be as hot an item as chili beans in Mexico. For all the facts and figures on Chevy's injectors see our story on page 94 of this issue.

Chevy's performance records with the great engine built by Ed Cole became legends in '55 and '56 and right now things must look mighty rosy to the big brass. For 1957 they're turning loose a new V8 engine called the Corvette that is a real short-fuse bomb. With fuel injection it turns out 283 horsepower to match its 283 cubic inches. Without injection you get 270 horses. The line offers three other V8 jobs and the 140-hp six, plus a new triple-turbine transmission.

In the way of design, the new car follows the other '57 model with a flattened-out front fender line and a meat cleaver rear fender silhoutte. It has been lengthened by 2½ inches, lowered slightly and sports the new 14-in. wheels. You'll find my opinions on these small biscuits in my Ford test article in this issue. The grille now has a wide V decoration reminiscent of the Caddy of a few years back and there are two cheese-cutters on the hood.

As for other GM cars, I guess I won't be spilling the cole slaw early to mention that the '57 Cadillac Eldorado has a completely restyled rear end and that later this year will come the Brougham with a hatful of new developments.

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velopments.

STUDEBAKER for '57 has quite a few innovations not offered by the Big Three. The huge engine used in the Golden Hawk series last year, displacing 352 cubic inches, has been whittled down to 289 inches. This makes the '57 Golden Hawk a better balanced job road-wise. Studebaker is claiming a 15 per cent increase in performance over last year's Golden Hawk by adding a supercharger to the lighter 289-cubic-inch engine. This supercharger will give a five-pound boost and is driven by a variable-rate pulley for top power during acceleration and normal fuel consumption at cruising speeds. The main fault of the '56 Golden Hawk seemed to be in the cam design, which did not allow this car to unravel as much as desired. However, as last year's Hawk could easily top 120 mph, the 15 per cent increase seems very optimistic at this writing.

The rest of the line consists of the President Series, highlighting a four-door station wagon, also a 289-cubic-inch engine, unblown, down to the Silver Hawk Six with a 185-cubic-inch mill (the old Champion). Another new item offered on all V8 models is the so-called Twin-Traction rear axle which automatically divides the engine power between the rear wheels. This is to stop wheel spinning and slipping in ice or mud and is designed to give 80 per cent of the driving force to the wheel with the poorest traction. If it works as well as claimed, it should be the outstanding feature of the year in any car. This should make the car so equipped equal to a Jeep in pulling up icy hills, as even the four-wheel-drive Jeep is reduced to two-wheel-drive (two on right side or left side, or alternate sides) when the going is real slippery. (Continued)

LINCOLN

NO one will dispute the fact that the 1956 LINCOLN is one of the best-looking cars on the American road. However, in keeping with the trend Lincoln, like all other manufacturers for '57, has restyled and made numerous changes. The new models are longer and lower than in '56 and again feature the '57 trend of the long rear fender fin line that bends out like the wishbone of an upside-down turkey.

The '56 Lincoln was conservative in its simplicity but for '57 Lincoln has added a few spangles. The star of the Continental hood ornament has been stylized and appears in many places on the new standard Lincoln. In the Premiere I tested, the star was not only adapted to the front fenders and the hub caps but was used as a hood decoration similar to but not quite like the expensive Continental. The '57 Lincoln has lost none of the famous handling qualities of former Lincolns, though there has been no noticeable improvement in over-the-ground performance. The brakes are phenomenally good. On one test I brought the car to standstill in less than 400 feet while driving at a full 100 mph.

The engine, as big as the inside of a brewery, is as smooth as the inside of a shaving mug. This year it sports a four-barrel Carter carburetor, replacing the Holley used for so many years. Looks are the big deal, though, and everything from the windshield wiper to the fenders is different. Lincoln, like many other big cars, is staying with the 15-inch wheel. Zero to 60 still takes 12 seconds on this job, which is not jet stuff, but then guys who buy 5,000-pound Lincolns hardly expect to get in the line-up as over-enthusiastic rodders. This is a fine car, built to appeal to the same kind of people.

similar to but not quite like the expensive Continental. The '57 Lincoln has lost none of the famous handling qualities

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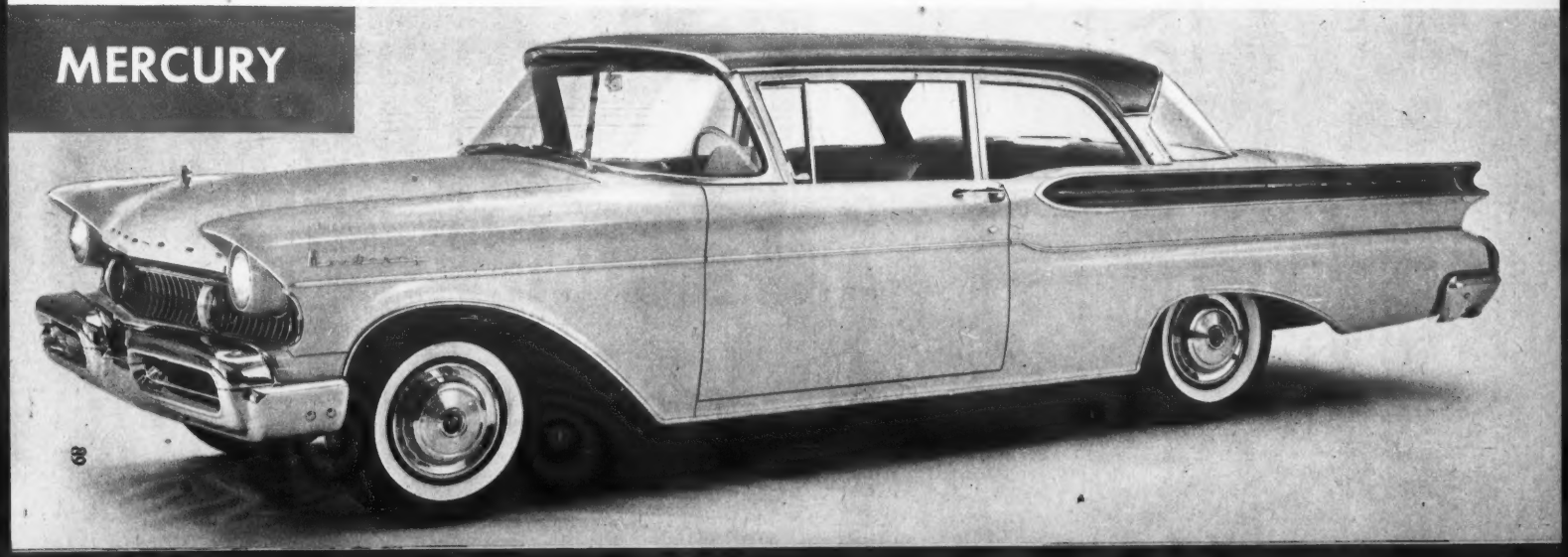
WHEN I recently tested the '57 MERCURY I devoted most of my time to the new Turnpike Cruiser which, because of release deadlines, I can't discuss in this issue. But I can tell you about the standard Mercury for '57—probably the furthest departure from what we know as standard in looks. It is so entirely different in every respect that it could be a product not even manufactured by the Ford Motor Co. Height has been reduced by about two-and-one-half inches and all interior dimensions such as hip room, leg room and shoulder room have been increased. Air cushion rear suspension will be on all Mercury station wagons. It will also be on all Mercurys with the 368-cubic-inch engine. Mercury convertibles will not have air cushion rear suspension.

The standard engine is a 312-cubic-inch job, the same as in '56, with a compression ratio of 9.75 to 1 and 255 horsepower, but there will be approximately a ten per cent increase in horsepower, which was accomplished by increasing the size of the intake manifold passages, larger valves and ports, higher compression and a brand new camshaft. The 368-cubic-inch engine will have a compression ratio of 10 to 1 and horsepower of 290.

On the standard jobs there is a governor-controlled fan that insures more horsepower as it cuts out at higher speed and when the engine is cold. It would be impossible to dissect this car completely in this short space, as it has more new features than any new car I've tested since World War II, except the Tucker. Go down to your dealer's and look this one over—it's loaded. In appearance, it's even more unusual than indicated in the photo. —*Tom McCahill* •



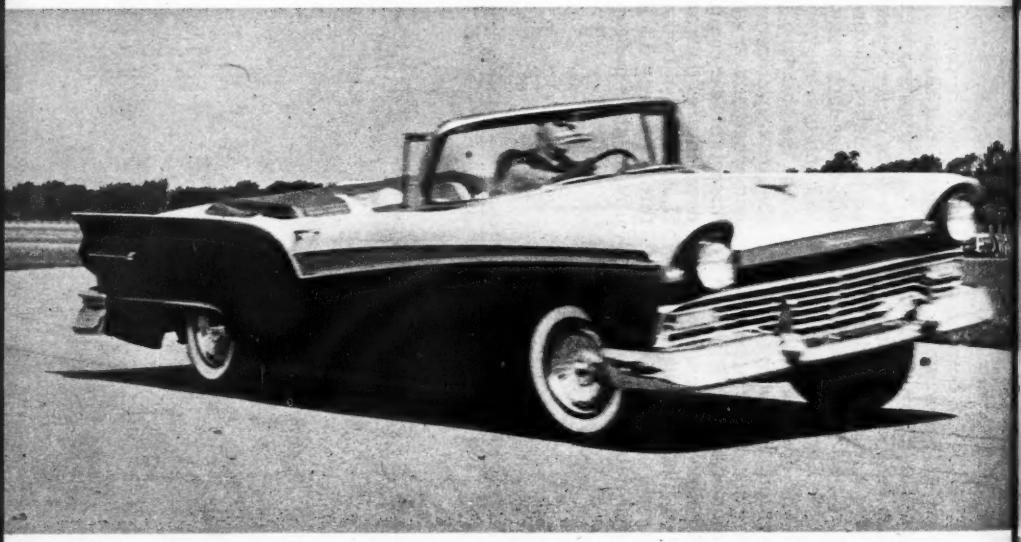
McCAHILL TESTS

A lower silhouette, 14-inch wheels and a top speed of over 100 mph, reports Tom of the big new Ford.

By Tom McCahill

THE '57 FORD

Tom also drove new convertible. He says the Ford corners "as flat as a mailman's feet."



THE FIRST car I ever tested for MI was the 1946 Ford. The new 1957 Ford, 11 models later, is a far cry from the goat bucket I drove with pride from coast to coast in the days when Alf Landon still had quite a crop of sunflowers left. The '57 Ford is bigger, more comfortable and many inches lower than its predecessor. It looks as though it costs nearly four times as much—and it does. In performance, the '57 Ford would make the '46 job seem like a lamplighter's pushcart.

I'm betting 1957 will be remembered as the year when car-manufacturers pulled out all the stops to make their earlier models appear to have been designed from sketches whipped up by Paul Revere while he was taking That Ride. As one of our biggest and baldest car-buyers, maestro Paul Whiteman, exclaimed when I allowed him to take a peek at the '57 car photographs I had in my office, "These new ones will make the customers throw rocks at any American car ever built before." I'm not prepared to back Paul in this statement but I toss it in as an observation made by a typical buyer of many automobiles over the years.

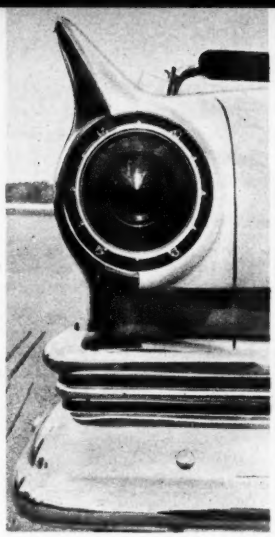
Hardtop Uncle Tom tested stands only 56.1 inches high, thanks to novel 14-inch wheels.

Basically, the Ford styling has not gone as wild as some other cars soon to appear. The Fairlane 500 is as good-looking a car as you'll find in the low-priced field and has enough outright glamour to satisfy the giddiest of hearts without resorting to just plain bad taste to knock your eye out.

Mid and late summer is the time I hate most for testing cars and that's when I usually end up testing the new Fords, since they are generally first on the market each fall. At this time, engineers are running around like pick-pockets on a sinking excursion boat and the public relations men and test-track attendants are full of energy but not much positive information. After 11 years I find I still must remind them that the majority of my readers are not interested in the undertakers' floral car model or the broom peddlers' special. The new model I want to test first is the one that most buyers will buy, the most popular item on the shelf. Then, for our sportier type of reader, I want the hairiest-chested, fire-eatingest little pedestrian-plower they can get me.

Top of station wagon's front fenders are flatter in '57 trend to lower look, says Tom.

Wide, sloping hood, slightly redesigned headlights are new styling innovations.



Ford's now distinctive taillights are bigger, upswept flare-out rear fenders new.

The new Fairlane 500 has a 312 cubic-inch engine the same size as last year's Mercury and automatic-shift T-Bird. This has been reworked extensively for '57, as follows. The intake manifolds have been opened up in the best competition manner. The valve area has been increased considerably and the newly-designed camshaft, among other things, lifts the valves higher. Restriction in the air cleaner has been cut in half. Though at this writing there are no Speed Week models in existence, there will undoubtedly be other additions filed within the 90-day Speed Week time limit. These will include multiple four-barrel carburetor manifolds and other goodies to brighten the hearts of the zip boys. This, of course, will be known as the Power Option Kit. However, as it's delivered this fall with conservative lapels, the 500 Fairlane with automatic transmission will crack under ten seconds in the 0-60 mph run and will top 110 mph without breathing hard. Bear in mind, this is with the Fordomatic transmission. How much more can be expected with a stick shift is open to speculation as no stick jobs were available for test during my trip to the Dearborn proving grounds. For real high-speed, screaming performance, we will have to wait for Speed Week.

After making an extensive survey (which included three Bronx Indians and a Canarsie cop) on what model they deemed the most important to test, most of our time was spent on the 292-cubic-inch, 118-inch wheelbase, four-door hardtop—the model expected to receive the greatest number of votes at the buyers' poll. This year Ford comes in two sizes: 118-inch wheelbase with an overall length of 207.7 inches; and 116-inch wheelbase with an overall length of 201.6 inches. The standard model I tested sported a quaint single-exhaust system, a 20-gallon gas tank and upsweep rear fenders that flare out in the to-be-popular '57 splayfoot, which will be as common this time next year as the sack cut of a monk's suit. The performance of this 292-cubic-inch, two-barrel job was certainly adequate, though not much more exciting than a good reproduction of Whistler's Mother. Zero to 60 mph averaged 12.1 seconds; 0-30 mph, 4.2 seconds, and 0-70 mph 16.6 seconds with a top speed of over 100 mph-plus.

One change of real importance that has been made at Ford this year is in the car's handling ability. As a matter of record, there was not too much wrong with the '56 Ford when compared with the competition. In fact, it was as good as and possibly better than any of them. In the '57, however, the handling has

been further improved by a better distribution of the weight, which comes closer to the desired 50-50 than Ford has come in many years. This has been accomplished by lengthening the tail feathers which, as you know, works the law of leverages. In spinning this job around Ford's tight-turn test course I found the '57 cornering as flat as a mailman's feet and in real competition style. The front wheels bit in and seemed to make a furrow for the rear wheels to follow, without the slightest trace of breakaway, even when I came close to rolling it a few times. This car was equipped with power steering which is much more responsive for '57. Though it is not rated as full-time, it took almost no effort at all to turn the wheel.

This is the first '57 test report we've had on the new-type 14-inch wheels. To this writer, 14-inch wheels amount to as much advancement as jumping off the top of the Empire State Building because the elevators are too slow. In a nutshell, I think the 14-inch wheel (and it will be pretty universal throughout the entire car industry this year) is a gimmick to lower a car's silhouette without making major structural changes. Some tire officials I have spoken to are not too happy about it, as their tires will wear out faster under hard running conditions and should get a lot hotter than tires of larger circumference, due to the reduced area for heat dissipation. If you have any doubts that lowness can only be attained by shrinking the wheels, bear in mind that the MG-TC, almost a yard lower than the new cars, had 19-inch wheels and several inches more road clearance than any of this year's offerings.

Because of this reduced clearance, more than 50 per cent of the 1957 cars will only be fit for first-class hardtop roads. Driving these super-underslungs over farm paths or secondary roads with high crowns will cause more oil to be spilled than the torpedoing of an Esso tanker. Besides, worms are a very important part of farming and worms stand to be [*Continued on page* 186]

SPECIFICATIONS

MODEL TESTED:

1957 Ford 4 dr Hardtop

ENGINE:

V8 cylinder, OHV; bore 3.75 inches, stroke 3.3 inches; maximum torque 297 foot pounds @ 2700 rpm; brake horsepower 212 @ 4500 rpm; compression ratio 8.6 to 1.

DIMENSIONS:

Wheelbase 118 inches; overall length 207.7 inches; tread 58.9 inches front, 56.4 rear; width 77 inches; height 56.1 inches; weight 3,732 pounds; standard tire size 7.50x14; gas tank 20 gals.

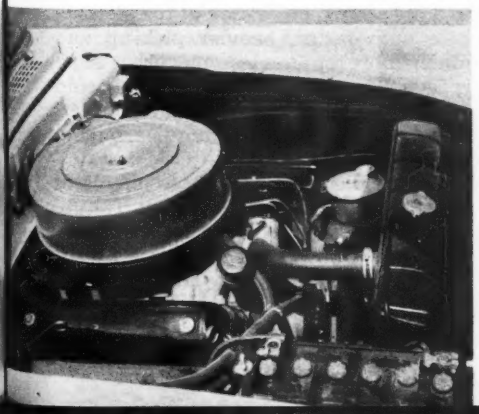
PERFORMANCE:

0 to 30 mph, 4.2 seconds
0 to 50 mph, 9.1 seconds
0 to 60 mph, 12.1 seconds
0 to 70 mph, 16.6 seconds
Top speed, 100-plus mph.

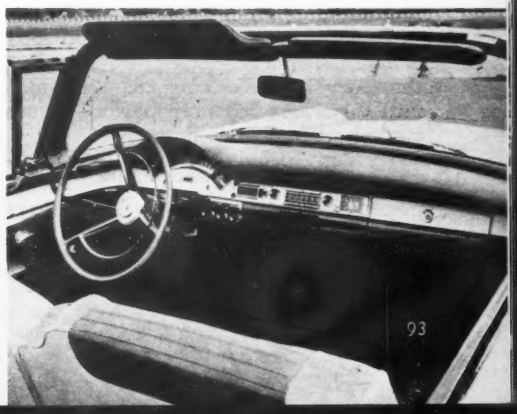
SPEEDOMETER ERROR:

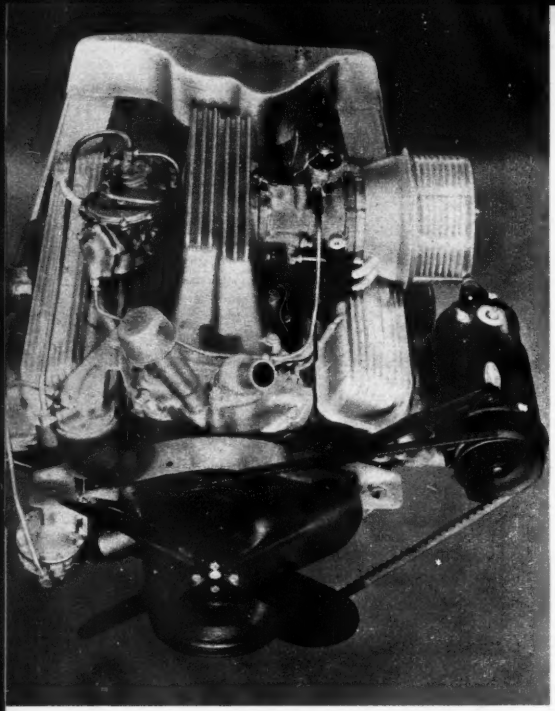
At 60 mph on speedometer, actual speed 58.9 mph.

Tom topped 100 mph in hardtop with 292-cubic-inch engine, automatic transmission.



Ford's instruments are neatly centered under hooded dash. Upholstery is luxurious.





CHEVY'S

Chevrolet makes history by introducting no-carburetor engine on its 1957 models.

Fuel injection (lighter-colored section) banishes the need for a carburetor. New air cleaner is at the right and high-pressure gas pump at the left.

CHEVROLET tossed a bombshell into the heavily competitive automobile industry on October 17 when it announced that fuel injection—a radically new and more efficient method of getting gasoline into the engine—will be available on every one of its 1957 models, as an extra-cost item.

Six months ago MI predicted that one manufacturer, maybe more, would introduce fuel injection on '57 cars. But it was generally assumed that the injector—which does away with the conventional carburetor—would make its bow on a premium-priced automobile. By making this important new engineering achievement available first on the least expensive car in its line, General Motors surprised everybody.

Chevy's version of fuel injection (FI) is optional on a new blockbuster engine, the Corvette V8. This 283-cubic-inch mill turns out 283 horsepower—a fantastic horse-per-inch figure.

To many people the term fuel injection is one that means little. Basically, FI replaces the carburetor, which mixes the gasoline and air and feeds the mixture to the cylinders. Trouble is, the near cylinders don't get the same amount as the far ones. FI has a nozzle at each cylinder to introduce under pressure exactly the same fuel/air load into every chamber. After that the plug fires and the rest of the operation is the same as on a carb-fed engine.

Injection promises a good many advantages, chief among them being economy and instant response. Injectors use the minimum amount of fuel for any given number of cylinders, making for a real savings. And with force-fed fuel at all speeds there will be no acceleration lag as with a carb. When you press the accelerator the response will follow as quickly as the "Boom!" when you pull a shotgun trigger.

The new rig means an automatic boost in horsepower, more kick at the starting gate with faster, heavier pick-up and much more sputterless power at slow speeds. You can add instant hot-or-cold starting, faster warm-up and smoother, silent running. And no more carb icing and vapor lock.

One of the most noticeable effects of FI won't be seen in '57, however. Taking off the top-mounted carburetor allows designers to lower the hood line by six or seven inches. Chevy couldn't do it

NEW FUEL INJECTION

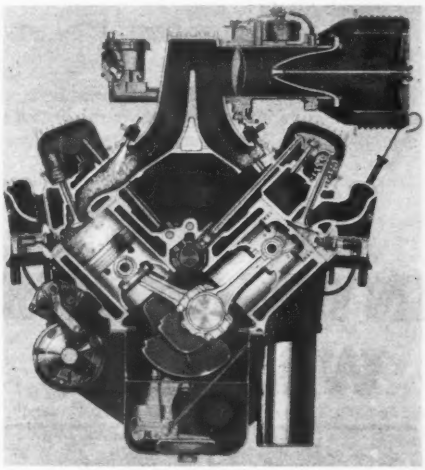
this year because FI is only optional equipment. So they settled for a major face-lift.

Fuel injection is not a new idea but Chevrolet is the first U. S. production car to have it. Two years ago Mercedes-Benz came out with the world's first gasoline FI system on its 300SL, selling for around $8,000. This sports car has remarkable pulling power at low speeds and a top speed of 150-plus mph.

FI is a very complicated instrument made with fine-watch precision. The accelerator actually controls only the flow of air to the engine. A pressure-sensitive plunger measures the air and feeds gasoline accordingly. A high-pressure fuel pump then shoots gasoline into the intake chambers. Nozzle orifices on the Chevy set-up measure .011 of an inch and carry a pressure of 200 pounds per square inch, making a fuel spray so fine it cannot be seen with the eye.

Fuel pressure is cut automatically when decelerating or going downhill. A rich mixture for fast starting is provided by an electric choke plus a fuel-plunger control. The system has an oil-wetted air cleaner, stowed beside the engine.

Other car makers, all of whom have been working on their own fuel injection, have but one course of action now. Go to FI—and soon. •



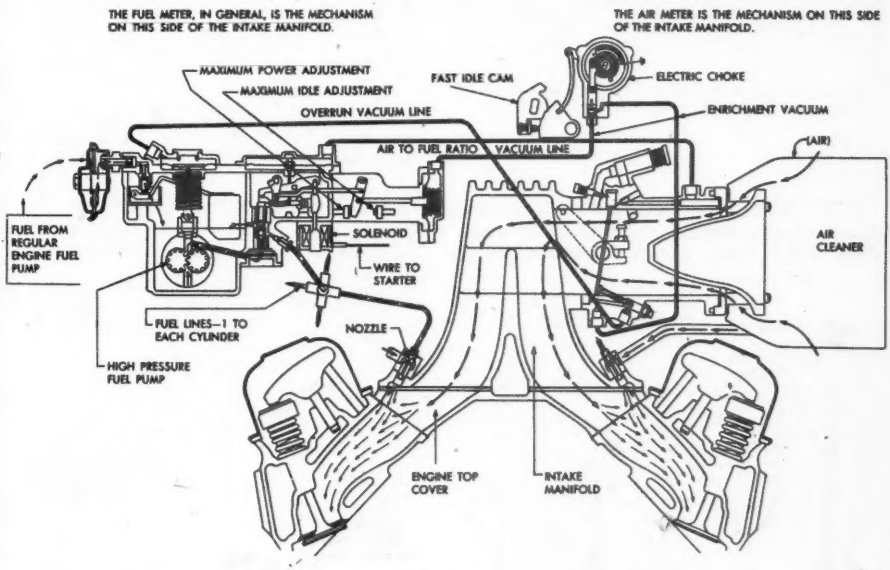


Diagram and cutaway indicate how the new Chevy system operates. Each cylinder has individual nozzle and gets exactly same feed.

NONSKID EGG-BEATER equipped with a suction cup to grip the bottom of the mixing bowl. Philip Kochman, Lawrence, Mass.

FOR HOME PASTRYCOOKS, a spray can for greasing pie pans without greasing fingers. Mrs. James Traucht, Jenera, O.

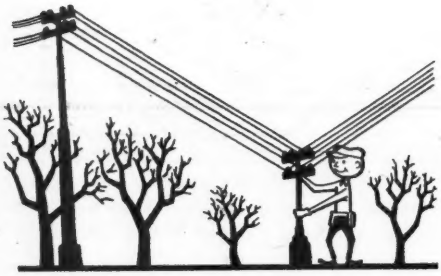
INVENTIONS WANTED!

Is there a gadget you think should be invented? If so, send its description to Inventions Wanted Editor, MECHANIX ILLUSTRATED, 67 West 44 St., N.Y. 36, N.Y. Each one printed will be awarded $5.

FOR CLEANER CAMPING and traveling, soap in a tube that can be packed in handbags, suitcases. Earl Smith, Bessemer, Ala.

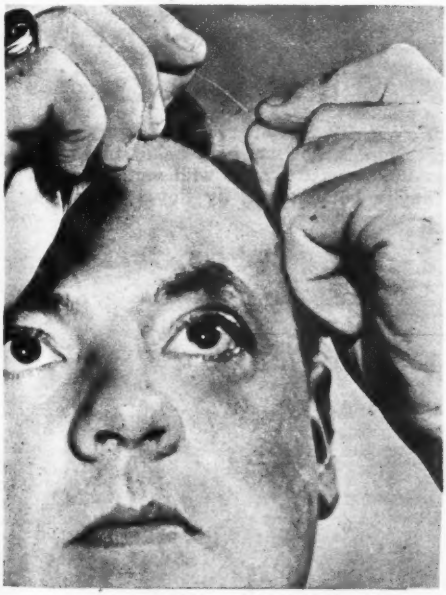
TELESCOPING TELEPHONE POLES to make the lineman's work easier and at the same time safer. Peter Kopach, Ramsey, N. J.

SHOTGUN AND RIFLE KITS for the amateur gunsmith, sportsman, general do-it-yourselfer. Mike Pullen, Caldwell, Idaho.



HIGH GRADE GRAVEL, freshly hand-sifted from Colombian emerald mine. Gems will bring as much as $11,500,000 per pound.

IT'S NEW!



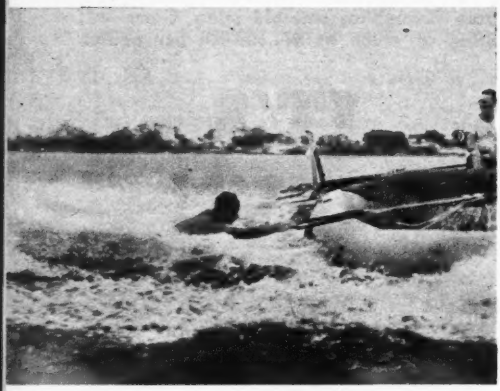
REAL COOL, say Transit Authority men Joseph O'Grady and Charles Patterson as they dig New York subway air-conditioning.

PERFECT IRON CRYSTAL with tensile strength of 1,900,000 pounds per sq. in. has been grown in General Electric lab.

CONTINUED...

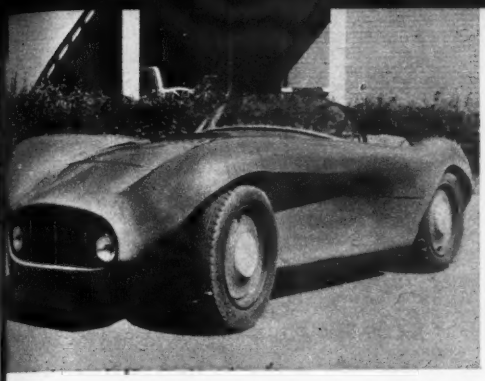
MIRROR LENSES for partially blind provide 320 per cent magnification, said to be quite distortionless, through the use of multiple mirror reflection.

BLOWN UP SHOES reduce Tommy's foot pressure, keep him from being blown up as he explores terrain with mine detector. They're being tested by Royal Engineers.



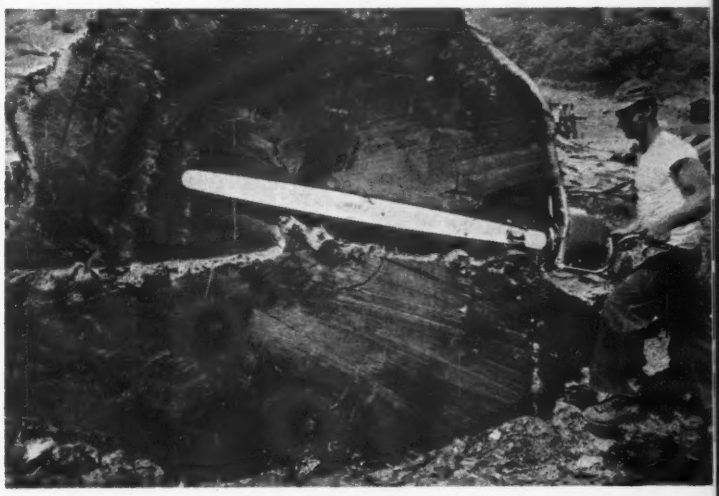
SLINGSHOT RESCUE: frogman is moving forward faster than the rescue craft as tensioned cord device pulls him aboard. Device allows men to be picked up at speed.

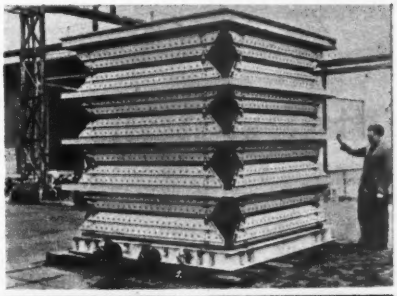
TINY COMPRESSOR run off jet engine of DC-8 passenger plane produces enough cold air to cool seven average dwellings. It's a new Carrier Corporation product.



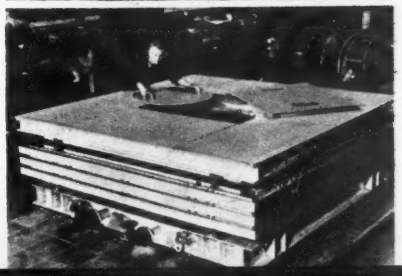
BOLT-ON BODY, Fiberglas, is built by Almquist Engineering, Milford, Pa., to fit any auto chassis. Comes in two sizes.

TERRORIST GIMCRACK being sold on Athens streets has EOKA and map of Cyprus on butt of handy pistol-shaped comb.





PAUL BUNYAN himself couldn't cut that tree in 45 minutes, but that one-man chain saw did. It's the newest model put out by Titan Chain Saws, Seattle.



COLLAPSIBLE TANK recently put on British market permits a ship to carry liquid cargo in one direction, return with solid cargo stowed atop tank.

PDC president John F. Rockett, Jr. and labor-saving device—sausage-making machine.

He'll Buy Your Inventions

If you have an idea for a new invention John Rockett's Product Development Corp. would like to hear from you.

By John N. Makris

GOT an idea for an invention you believe is new, practical and useful? Then John F. Rockett, Jr., president of the Product Development Corp. of Boston would like to hear from you.

Rockett, whose newly established firm brings together the man with an idea and the company with the plant and capital to develop the idea, estimates there are 20,000,000 would-be inventors

in the United States, representing an enormous treasury of new products, gadgets and services. But only a small percentage of these, Rockett recognizes, are worthy of commercial development.

An invention, whether a machine or a gadget, must be able to do a faster or better job for less money in its particular field to be of any interest to Rockett. He emphasizes that with new product competition what it is today, the need is for workable ideas that are simple and novel. Rockett wants only practical and original devices that are easy to make and sell.

One such successful idea was conceived by Merton L. Clevett, Jr., a mechanical engineer in the Army's Quartermaster Corps and part-time inventor. This was a new type self-aligning ground anchor with an attached cable to support power lines, fences, trees, signs, etc.

As it developed, Clevett's anchor became the most inexpensive device available for supporting loads ranging from 1,000 to 10,000 lbs., especially when the labor-saving installation factor is considered. It can be installed in the ground manually in less than three minutes. For the Malleable Iron Co., of Laconia, N. H., Clevett's anchor was just what the doctor ordered.

Another manufacturer called on PDC for a product that would make him independent of government contracts. Rockett came up with an electronic pulse detector (Palpatron) that this company was capable of manufacturing. This was Rockett's own invention, one that is now widely used in hospitals for detecting cardiac symptoms and arresting the possibility of heart failure in a patient during an operation.

Some inventors have manufactured and marketed their ideas but with no great success because of a lack of financial resources. PDC, with its domestic and foreign clients eager for new products, can do a lot with such items.

A recent visitor to PDC offices at 80 Federal Street was Sidney Cohen, a young Newton, Mass., inventor. Cohen liked to putter on the greens, but didn't like the idea of lugging his heavy golf bag for 18 holes.

Cohen's thoughts along these lines resulted in the Cadi-Ette, a revolutionary new type of golf carrier capable of holding two to ten golf clubs.

The Cadi-Ette retailed for $3.50. Cohen, through direct mail advertising, sold 10,000 of them over a three-year period. But for a product with such terrific potential, considering the 12,000,000 golfers in the country, the merchandising of Cadi-Ette left much to be desired. Cohen went to PDC.

Rockett's vice-president, 28-year-old Lea M. Griswald, a graduate of Harvard

Know-how of PDC helped to make success of inventor Sidney Cohen's unique Cadi-Ette.

Members of Rockett's staff carefully unwrap each invention received in the mail.

Business School, agreed that Cohen's patented Cadi-Ette was a selling commodity. It was earmarked for a manufacturer dealing in sporting goods—one with financial resources and a promotional setup not available to the individual inventor, who would turn out the Cadi-Ette in volume and thereby reduce the original price. With the problem of merchandising eliminated, PDC estimates that Cohen will receive royalties on an annual sale of at least 30,000 Cadi-Ettes.

Another success story is that of Carl Schwartz of Elkhart, Ind. Schwartz invented a sausage-making machine capable of turning out all kinds of meat patties. This machine, a labor saving device, is now being tested by commercial meat packers of Cleveland before being marketed.

Paul Grindle of New York City conceived the idea of a Copy-Writer, a device adaptable to any office typewriter, that does away with carbon paper yet turns out four carbon copies.

From another inventor came a compact electronic compass for small boats. This was actually a navigation instrument with an entirely new concept for direction steering.

Rockett himself has always liked to tinker with inventions in his spare time. What with 48 patents disclosed or pending, the 28-year-old executive is no novice in the engineering field. Setbacks and obstacles did not discourage him, although they did annoy him because he couldn't see any valid reason for them. As a result, during the disheartening process of seeking markets for his inventions, Rockett became acutely aware of the gulf between inventors and industry.

It was at this point that the initial idea for PDC came to Rockett; the idea being to close the broad and often hostile gap between inventor and manufacturer with an entirely new working method. This would be accomplished by Rockett setting himself up in the capacity as a clearing house and, although unorthodox but logical, getting the manufacturers to foot the bill. It was the manufacturers with money tied up in production plants who had the most to gain, theorized the inventive Rockett.

In the past, the individual inventor paid a go-between to get his invention accepted. This was costly and a failure or two often ended the inventor's creative urge.

With this in mind, Rockett went to the American Research and Development Corp. in Boston with his idea. Their purpose is to analyze new developments and to give financial backing to those ideas which seem most favorable for new business ventures. As a result, ARD&D has invested in over 30 companies, among them Ionics, Inc., Magnecord, Inc., and Tracerlab, Inc.

ARD&D provided the initial capital for Rockett's company. Recently, however, Rockett was able to buy the investment concern's interest and establish PDC as an independent enterprise.

Rockett's staff screens carefully all ideas, which come to his office at the rate of 50 to 60 a day, and debates what manufacturer's production setup is best suited for the particular product with its inherent possibilities.

"If one idea out of 50 pans out," says Rockett, "then I am not wasting my time."

After PDC is retained by a company seeking a new product, Rockett, often with vice-president Lea Griswald, goes into the organization and makes an informal but comprehensive survey of the company's personnel, facilities and markets. Rockett tries to unearth any latent talents they may have in production, engineering or merchandising. From this analysis he learns two important things: 1. What a company can do. 2. What the company cannot do.

Then Rockett returns to his office and gives serious thought as to what type of product or product line the client needs. Next the search begins—first in PDC files, then finding the inventor with the right type of product.

Once a suitable product has been chosen, PDC and the company go to work together to try and figure out the production and merchandising problems. This is part of the overall operation of PDC that has made both manufacturers and inventors extremely happy.

Within two months after its organization, PDC was plowing steadily through black ink. Its client list, from all over the country, has steadily increased. The smallest firm has assets of $50,000 and the largest $3,000,000.

After a protected product goes into production, the inventor collects royalties from the manufacturer—a small percentage of sales. PDC charges its contracted clients a yearly fee of $10,000 plus one per cent, or $5,000 plus two per cent of the sales of the manufactured product from the client. The inventor pays nothing.

If any MI readers have a good invention or an interesting commercial product and would like it to be considered by PDC for possible placement with one of its clients, the first step is for them to send a postcard saying:

"I have (describe invention or commercial project) in the following field: Please send instructions for submitting idea to your firm."

Rockett prefers patented devices but it is not unusual for an inventor to submit an unpatented idea to PDC. If PDC thinks the idea has merit, it urges the inventor to seek patent rights.

Rockett has this advice for MI reader-inventors:

"When you find some solution to a problem, the first thing to do is to conceive of the method or device which you will use. Then make sure of its practicality by making a working model which will later lead to a production model."

Here are a few suggestions for would-be inventors as to what Rockett feels would stand a particularly good chance of succeeding in the fields of invention and gadgetry:

Any kind of a product that would apply to the machine tool market, aviation, automotive, home appliances, home workshops, new devices for telling time, new devices for drilling holes, new types of packages and fasteners, new toys, anything for the leisure market (sporting goods, etc.) and any new types of electrical products.

"There is no limit on what is wanted provided the product is sensible and practical," says Rockett. •

PDC vice-president Lea M. Griswald and Copy-Writer which eliminates carbon paper.

Rockett poses with a group of inventions that his corporation has made successful.

Rockett and Griswald in their crowded stockroom with devices being processed by PDC.

MI PIN-UP CAR

1900 WHITE STANHOPE STEAMER

Owner: Jerry Foley, Jacksonville, Fla. Engine: 2-cylinder double-acting steam engine, 6 brake horsepower. Wheelbase: 66 in. Weight: 1,100 lbs. Top speed: approximately 60 mph. Said to be oldest White Steamer in the U. S. Original cost was $1,000.

Pilot Alain Hisler in cockpit of French Sipa Minijet during recent flying competition.

French Midget Jet

The little Minijet zips along at 250 mph and may become the big liaison plane of tomorrow.

WIN $25

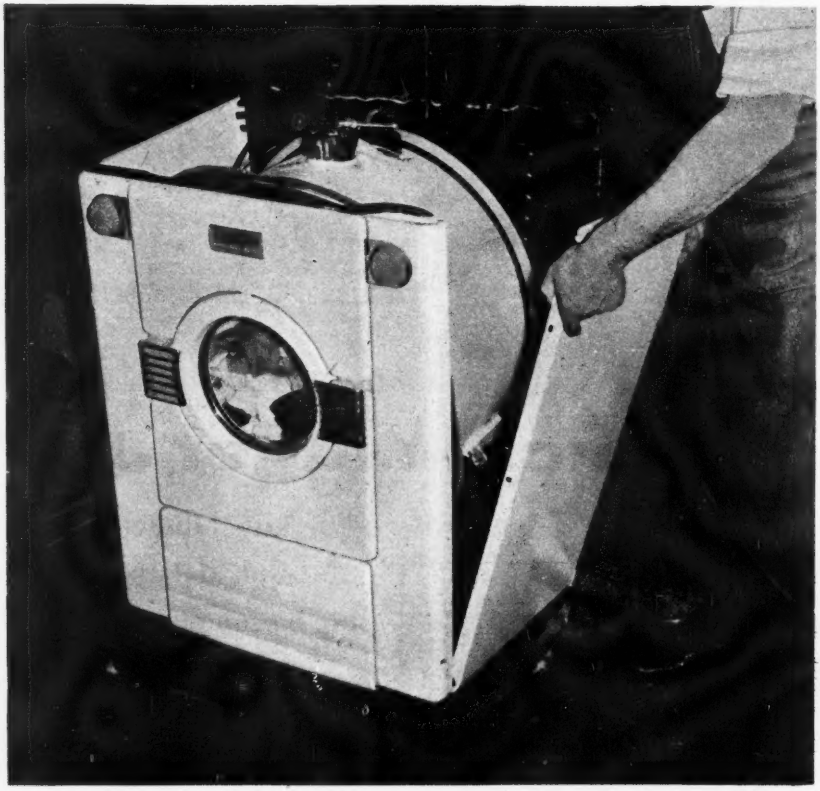
You can plunk $25 in the family bank account if you send in a sharp, glossy photo of an old-time car posed with the owner or a pretty girl. Car can even be new—if it is unusual. Include a self-addressed envelope (just in case) with all the vital statistics about car and owner to Pin-Up Editor, MECHANIX ILLUSTRATED, 67 West 44 St., N.Y. 36, N.Y. You may win that $25.

THE tiny jet aircraft shown above is no mere novelty, though it is undoubtedly one of the smallest jets yet built. In recent aerobatic competitions in England it placed second against a number of British, Dutch, German and Spanish planes that were not designed to look cute. It's called the Minijet and its makers hope it will prove a useful training and liaison plane. •

Minijet stands six feet high, has a 23-ft. span, 17-ft. length. Powered by a turbojet engine, it has 250 mph top and a range of 350 miles. It seats two side-by-side.

SPECIAL SERVICE SECTION

How to Service the Bendix Washer



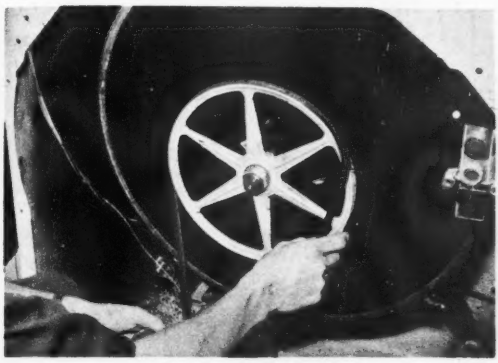
BEFORE attempting any repairs on your home washer it is essential that the various steps of a washing cycle are fully understood. It has been found in many cases that an owner may think his machine needs service when actually all that is needed is some common sense in following the manufacturer's operating instructions. Lots of research has gone into the design of the modern washer and it is real folly on the owner's part not to follow the maker's instructions.

Basically the various steps of a washing cycle are as follows: when the machine is turned on, both the driving and timer motor start to operate. The driving motor turns the cylinder containing your wash. The timer motor, from the instant it starts until it reaches the "Off" position, continuously turns a system of cams which open or close electrical circuits that are connected to solenoids for inlet, drain or shifter operations.

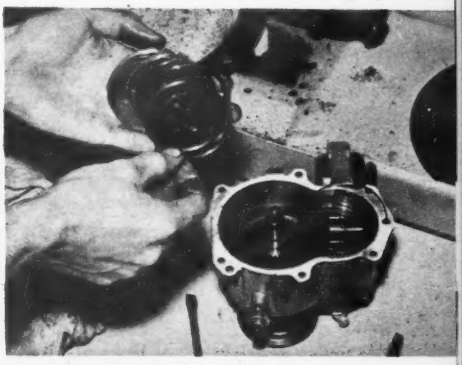
When the control knob turns to the beginning of the "soak" period, the drain closes and the inlet valve opens to admit lukewarm (95-101°F) water until the correct level is reached. At this point a float or water level switch activates another electrical circuit which causes the inlet valve to close.

By Clarence Martin

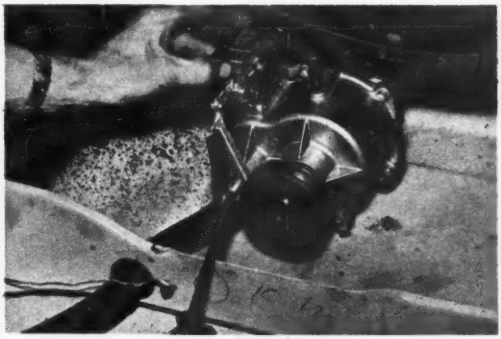
Remove rear panel to gain access to motor. Belt comes off by turning counterclockwise.



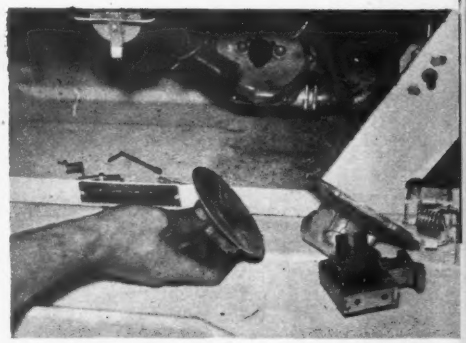
Transmission housing holds the clutch plates and gears. See detail drawing on page 113.



Screwdriver adjusts clutch for 7/32 to ¼-inch clearance between solenoid and plunger.



The impeller is shown being removed as part of installation of new seal in drain pump.



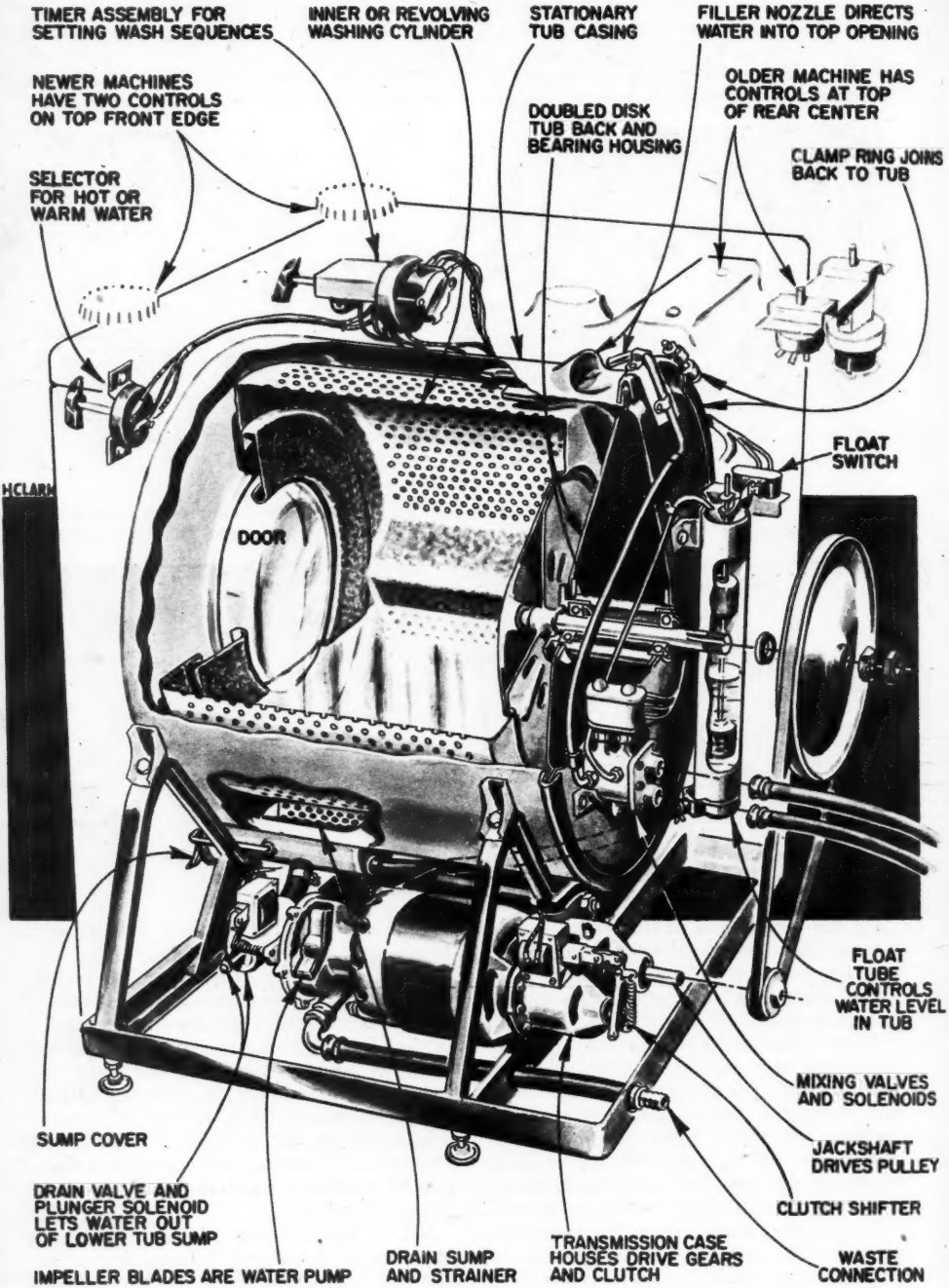
At the conclusion of the soak period, ten minutes or so, the drain opens, allowing the water to be pumped away. The machine stops as the control knob comes to rest at the "Off" position on the dial.

When the knob is moved slightly clockwise the unit starts the selected wash period. All operations that follow are completely automatic, requiring no further attention from the operator other than adding soap, blueing, etc., or resetting of the dial for extra dirty clothes to give an additional wash period.

During the wash period the machine repeats the movements of the soak period except that the water temperature is now at least 160°F instead of lukewarm.

After the dirty wash water has been drained and pumped away clean lukewarm water enters for the first "rinse" period. During this cycle the drain valve remains open. As soon as the flow of entering water stops, the cylinder shifts into high speed (333, 402 or 525 rpm, depending on the model) for the first "extraction" period. This removes the excess water by centrifugal force and pumps it away.

When the cylinder slows down the drain valve closes and lukewarm water enters for a second rinse.


TIMER ASSEMBLY FOR SETTING WASH SEQUENCES
INNER OR REVOLVING WASHING CYLINDER
STATIONARY TUB CASING
FILLER NOZZLE DIRECTS WATER INTO TOP OPENING
NEWER MACHINES HAVE TWO CONTROLS ON TOP FRONT EDGE
OLDER MACHINE HAS CONTROLS AT TOP OF REAR CENTER
DOUBLED DISK TUB BACK AND BEARING HOUSING
CLAMP RING JOINS BACK TO TUB
SELECTOR FOR HOT OR WARM WATER
FLOAT SWITCH
DOOR
FLOAT TUBE CONTROLS WATER LEVEL IN TUB
MIXING VALVES AND SOLENOIDS
SUMP COVER
JACKSHAFT DRIVES PULLEY
DRAIN VALVE AND PLUNGER SOLENOID LETS WATER OUT OF LOWER TUB SUMP
CLUTCH SHIFTER
TRANSMISSION CASE HOUSES DRIVE GEARS AND CLUTCH
DRAIN SUMP AND STRAINER
WASTE CONNECTION
IMPELLER BLADES ARE WATER PUMP

Again the cylinder shifts into high speed, extracts and pumps out the water. The third and last rinse follows, repeating the above procedure.

After the final rinse the timer control pointer will have returned to its off position and the entire unit will automatically shut off.

It is not the intention of this article to give advice to trained service men but rather to point out the minor repairs and adjustments that may be made by the average home owner without the help of a mechanic. Other repairs, especially those requiring special tools, should always be placed into the hands of the skilled repair man and should not be undertaken by the amateur. Very often a minor adjustment, if handled wrongly, will turn into major damage with a correspondingly high repair bill. If you are not sure what is wrong or doubt your own ability to handle it, call the mechanic.

Safety is all important. Care must be taken not to get your hands caught in the whirling cylinder, belt or other moving parts. Keep constantly in mind that it is extremely dangerous to work on any electrical equipment when standing on an excellent ground such as a damp concrete floor with metal water pipes close at hand. Always disconnect the power before starting any repair. It could be fatal otherwise.

Our trouble shooting chart on pages 110-111 lists many possible washer troubles, their probable cause and suggested correction. While an attempt has been made to group these by area, some will overlap. Also, since components are not necessarily identical in all models a few items apply only to those machines using the particular part mentioned.

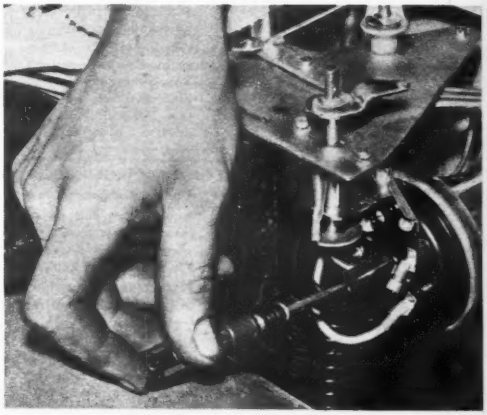
Service Instructions

The following is the recommended procedure for the repair, replacement and inspection of various parts of your washer as called for on the trouble-shooting chart.

1. To replace interval timer or time control switch.

Remove the dial bezels, top panel attaching screws, soap diaphragm retainer and top panel. Disconnect the wiring

Unit with top removed shows timer assembly, filler nozzle and mixing valve assembly.



The water level on the late model Bendix can be regulated at the pressure switch.

Photo below shows the replacement of a defective water temperature control switch.

Trouble Shooting

TROUBLE	PROBABLE CAUSE	SYMPTOMS AND CORRECTION
1. House fuses blow		
a. Fuses too small (15 amp. for #14 wire is O.K.; check regulations)		Replace fuse of correct size or install Fusetrons.
b. Overloaded circuit		Connect unit to more lightly loaded circuit or install new circuit.
c. Defective motor		Try to run with belt removed. Check for grounds or shorts.
d. Overloaded washer		Remove part of load so no more than nine pounds of clothes remain.
2. Motor will not start		
a. Fuse blown		See No. 1.
b. Defective motor		Remove belt, repair or replace if necessary.
c. Defective time control		Motor contact in timer may be burned. Replace.
d. Defective wiring		Open circuit due to loose or broken connections. Voltage at motor terminals must not be lower than 100 volts. It may be necessary to increase line wire size.
3. Motor runs, cylinder does not turn		
a. Loose belt or pulley		Tighten pulley set screw.
b. Motor hold down bolt not removed		Remove belt and sleeve. (Some models have shipping bolt and sleeve to keep tension off belt.)
c. Low gear clutch retarder spring broken or badly worn		Replace spring so clutch will engage and not run free on jack shaft.
d. Binding low speed clutch		Low speed clutch nut must move freely to engage drive gear. Disassemble transmission, check parts and clean.
4. Unit floods or over-fills		
a. Inlet valve stuck, open or leaking		Inspect valve for cracked seats or foreign matter. See if lower plunger is binding.
b. Float switch imperfectly adjusted or defective		Adjust or replace.
5. Skipped spray rinses		
a. Drain screen clogged		Slow draining takes up spray-rinse time. Clean screen often.
b. Drain hose too long		Shorten outlet to no more than six feet from unit.
c. Drain hose obstructed		Remove obstructions.
d. Float sticking or plugged tube		(Some models only) Check parts and clean.
e. Top float clip too high		(Some models only) Adjust clip.
6. Inadequate spray		
a. Lower plunger of inlet valve stuck		Disassemble valve and clean. Check for restriction in hole in lower plunger and for faulty seat in top.
b. One water faucet closed		Indicated by weak spray in soak and last two rinse periods or in wash cycle with knob at warm. Open faucet.
c. Partial water inlet restriction		Clean clogged strainer in each inlet hose.
d. Low water pressure		Minimum recommended pressure is 20 pounds.
7. Tub fills when unit is idle		
a. Inlet valves leaking		Replace seats. Close faucets between washings. Check point on upper plunger for flaws.
8. Tub will not fill		
a. Defective float switch		If open, will not complete inlet circuit. Adjust or replace.
b. Dirty drain valve plunger		Water drains from tub as fast as it enters. Disassemble drain valve, clean, and replace.
c. Drain screen reversed		(Some models only) Float filler tube will fill faster than tub. Insert properly.
9. Water does not enter tub		
a. Inlet hose strainer clogged		Remove and clean strainers.
b. Defective float switch or float		Check parts and clean or replace.
c. Inlet valve closed		Clean.
d. Inlet valve coil open		Check and replace.
e. Timer contacts not closing		Adjust or replace.
f. Defective selector switch		If water enters for soak and rinse periods but not wash, switch probably defective. Replace.
g. Inlet water wiring circuit open		Inlet valve will remain closed. Trace and correct.
h. Float switch upside down		Switch should break circuit in raised position and close it in lower position. Check. (Some models only)
i. Inlet water faucets closed		Open both supply faucets.
10. Water does not drain from tub or drains slowly		
a. Drain valve clogged		Clean out.
b. Drain screen clogged		Clean out.
c. Water pump dirty or defective		Clean, repair or replace.
d. Drain hose plugged or kinked		Remove obstruction.
e. Defective drain solenoid		Replace.
f. Drain solenoid circuit open		Correct or replace open wiring.
g. Defective time control		Replace defective timer contacts.
11. Washer leaks water		
a. Door gasket loose		Adjust or replace. Also check glass gasket and door handle.
b. Cylinder back seal defective		Remove tub back and tighten or replace seal.
c. Pump seal or cover gasket defective		Inspect parts and tighten or replace.
d. Hose connections loose		Locate and tighten.
e. Drain case gasket leaking		Check gasket. Adjust toggle if its pressure on gasket is insufficient.

Chart

TROUBLE	PROBABLE CAUSE	SYMPTOMS AND CORRECTION
	f. Float filler tube misaligned	Realign.
	g. Soap door gasket not in place	Push down over rim for splash-free fit.
	h. Tub back gasket leaking	Check, relocate if possible or replace.
	i. Spray filler tube bent	Realign.
	j. Machine over-loaded with soap or substitutes	Soap and water being forced out air vent in soap door. Use only amount recommended.
12. Water temperature incorrect		
	a. Insufficient hot water available	Increase hot-water tank setting. Recovery may be poor. Larger tank may be needed.
	b. Selector switch or inlet valve coil wires reversed	Check wiring and correct.
	c. Inlet hoses reversed	Reconnect correctly.
	d. Dirty mixing valve	Disassemble and clean.
	e. Inlet valve thermostat defective or needs adjustment	Replace if defective. Early models have adjusting screw in bottom. Later models must be returned for critical factory adjustment.
13. Water drains during washing		
	a. Drain valve stuck open	Clean or adjust as necessary.
14. Unbalanced load in cylinder		
	a. Cylinder speed incorrectly set	Check speed and adjust. (Early models)
	b. Incorrect loading	Read washing instruction booklet.
	c. Incorrect water level	Check with cylinder empty and reset.
	d. Machine tilted to front or back	Check and level so clothes will not bunch in front or rear of cylinder.
15. Cylinder speed high		
	a. Scored clutch plates	Replace.
	b. Broken clutch release spring	Replace.
	c. Low level or old transmission oil	Drain, flush, and refill with good grade of #300 refrigeration oil.
	d. Shifter arm out of adjustment	Readjust.
	e. High speed gear splined sleeve binding	Remove, clean, and polish. Remove burrs from inside gear. Replace parts if badly scored.
16. Cylinder will not enter spin cycle		
	a. Water remains in tub	See No. 10.
	b. Defective clutch	Check adjustment. Replace plates if badly worn.
	c. Cylinder overloaded	Partly unload.
	d. Defective float switch, float stuck or improperly set	Replace switch, clean float parts or reset top clip. (Float chamber models only)
	e. Defective timer or wiring	Correct or replace if necessary.
	f. Defective shifter solenoid	Replace.
17. Excessive vibration during spin cycle		
	a. Shock absorbers loose or defective	Tighten or replace as necessary.
	b. Shipping brackets not removed	Late models have four on bottom and two on top. Remove.
18. Washer does not cycle		
	a. Timer motor defective	Replace.
	b. Worn or broken part in transmission	Disassemble, locate, and replace.
	c. Defective solenoid or defective wiring	Trace to locate and eliminate defect.
	d. Timer shaft or knob binding	Release.
19. Washer does not shut off		
	a. Defective timer	Replace.
	b. Transmission switch stuck	Free part or replace.
20. Washer noisy when operating		
	a. Defective transmission gears	Replace gears.
	b. Transmission oil level low	Flush and refill.
	c. Jack shaft bearing or housing bushings defective	Replace if badly worn.
21. Intermittent squeaks in unit		
	a. Glazed pump seal surface	Replace seal. Also inspect thrust washer and impeller. Replace if necessary.
22. Washing results not satisfactory		
	a. Improper washing procedure	Re-read washing instruction booklet or obtain demonstration.
	b. Incorrect cylinder speed	Check and reset (on early models).
	c. Missing spray rinses	See No. 5.
	d. Insufficient water	Minimum recommended pressure is 20 pounds, preferably 40 to 60 pounds.
	e. Incorrect water level	Reset.
	f. Reversed drain screen	Insert properly (float filler tube models).
	g. Unit not level	Re-level.
	h. Washer tears clothes	Cylinder may have rough spots that should be polished with emery cloth. Water level may be low.
23. Washer leaks oil		
	a. Transmission cover loose	Tighten or replace gasket.
	b. Defective jack shaft, motor shaft or shifter rod seal	Inspect and replace if necessary.
24. Washer stalls while running		
	a. Bearing dry and frozen	Lubricate or replace bearing.
	b. Broken part	Locate and replace.
25. Electric shocks		
	a. Ground in washer circuit	Trace and eliminate. Ground properly according to electrical code.
26. Washer moves on floor		
	a. Not resting on all four feet	Adjust leveling feet.
	b. Floor slanted	Level unit with spring.
	c. Excessive vibration	See No. 17.

harness by pulling out the two electrical connections and remove the two screws holding timer motor. Replace or repair the motor unit, being careful to note the exact position of all parts.

Contacts with terminal block and frame are replaceable on late models and contact block on earlier models. The cam and gear assembly should be carefully removed by working it back and forth slightly and pulling on it at the same time. It should then be gently installed in the new terminal block and frame assembly. Adjustment must be accurately checked in replacement.

2. To remove and replace belt.

Disconnect the inlet hoses and remove back panel. In both removing and replacing the belt, turn the pulley in a counterclockwise direction. Tension should be adjusted so that there will be about a one inch depression.

3. To remove and re-install the cylinder assembly.

Remove the panel, inlet valves and spray tube bracket. If the model contains a float chamber and switch, they must be disconnected and removed. The cylinder may then be taken out more easily if the unit is tipped over forward on protective cushions. After the belt and the tub back clamp ring have been taken off, the entire tub back and cylinder assembly may be removed as a unit. The cylinder pulley, outer spacer, tub back and inner spacer and washer can then be disassembled.

When re-assembling, the cylinder shaft at the point where it meets the reinforcing plate and also the last washer on the shaft should be coated with Glyptal or some other sealing agent. The cylinder shaft nut should be tightened securely but not excessively. The hole in the top edge of the tub back must be lined up with the hole in the tub flange when the tub back and cylinder assembly are set into the tub. After the screw has been tightened, the ring should be tapped all around with a soft hammer, then tightened again.

4. To install a door gasket.

The old gasket may be removed by pulling it from the door frame. When replacing it note that the upright sealing flange is off center. The edge farthest from this flange goes over the door frame first. If necessary, the inside of the gasket may be lubricated with soapy water.

A new gasket will be received "inside-out" and is rolled in place; it will shape itself to the door opening after use.

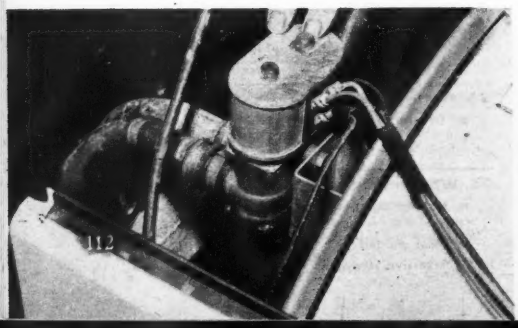
5. To remove motor, transmission and pump assembly.

Remove panels, pull wire tips out of connectors to motor, shifter, and drain solenoids; disconnect hose at drain valve, remove belt, loosen cap screw in front motor hanger clamp and loosen the nut from the rear end of the motor hanger rod. This will permit the assembly to slide back until the rear motor hanger clears the rod, at which point it may be removed.

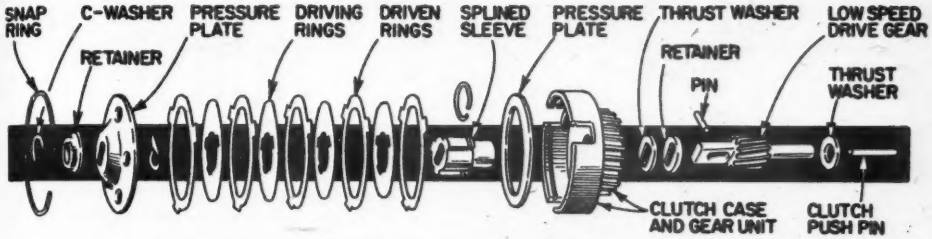
6. To replace the clutch plates.

Remove the drain plug, drain out the transmission oil and save it in a shallow pan. Pull out the two wires from the spin solenoid located at the left of the transmission, remove the six screws in the transmission cover, tap the housing to loosen the [*Continued on page* 166]

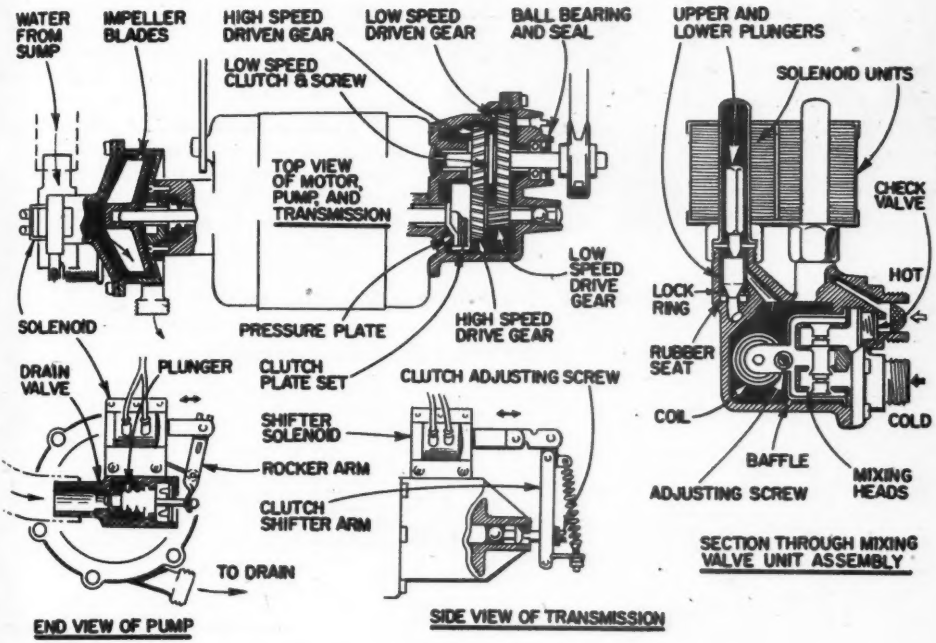
To disassemble mixing valve, first remove spring clips holding the solenoid cover.



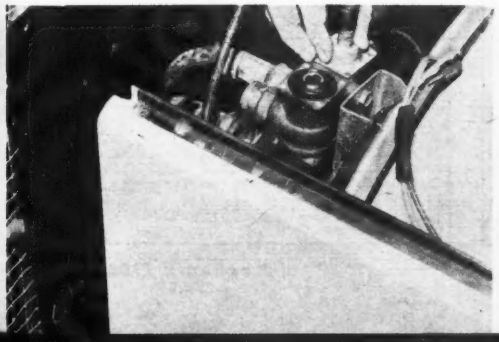
Next, after disconnecting the electrical leads, carefully lift off the solenoids.



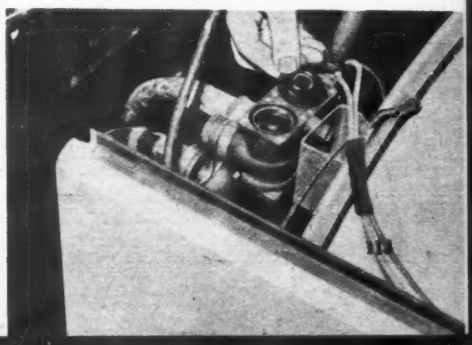
EXPLODED VIEW SHOWS CLUTCH COMPONENTS AND ORDER OF ASSEMBLY

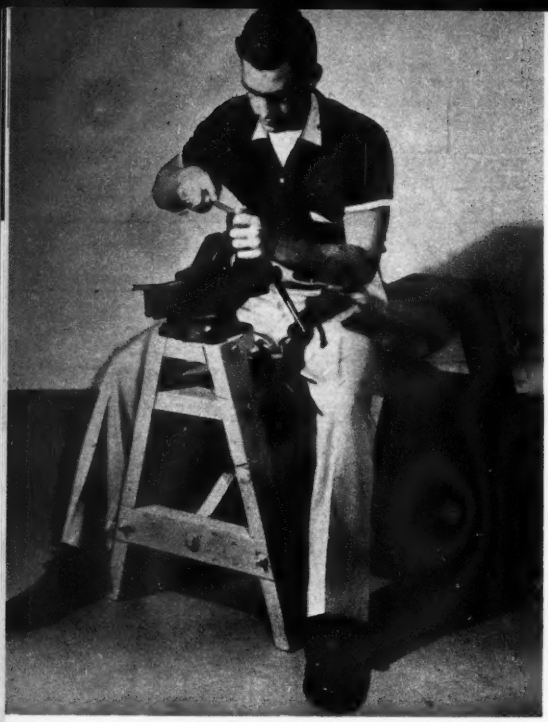


Remove the four screws holding the plunger cover and slide plunger out of valve body.



The diaphragm fits under the plunger cover around valve seat opening; just slip off.





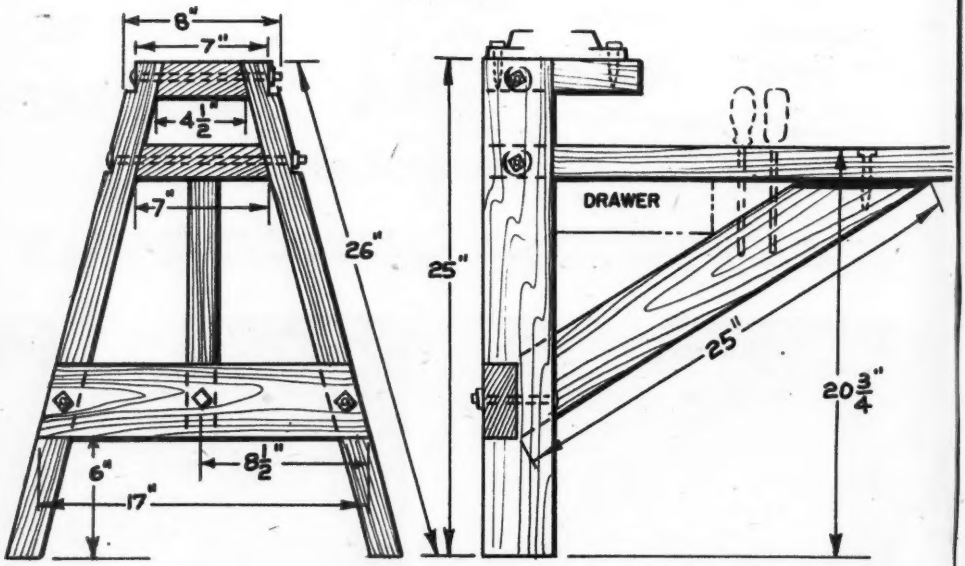
HANDYMAN'S HORSE

YOU can jump and "ride" this horse when you have some close work to do; if you find that you have to work near some other location you can just pick up and move. The horse's usefulness does not stop there—it can be used for any number of jobs around the shop or home, from a special camera mount, to holding an oversized piece of lumber.

It's easy to build, too. A portable electric saw can be used to cut the necessary lumber to the dimensions shown on the diagram below. Since no glue has to be used in construc-

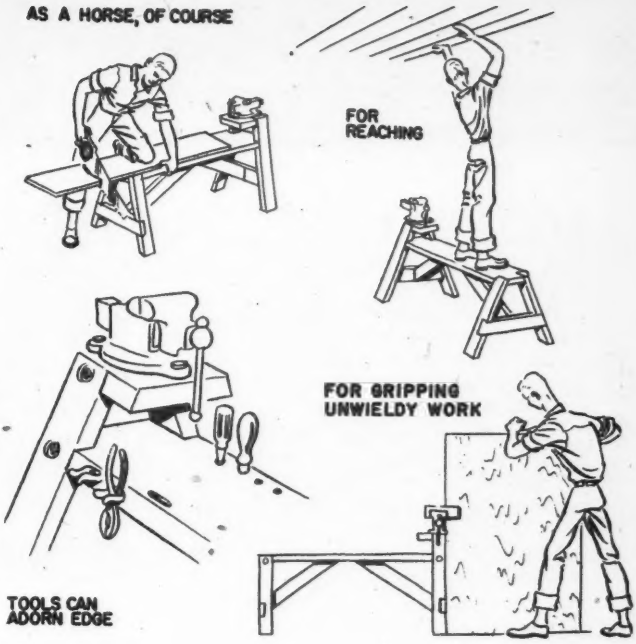
You'll find that this horse-bench will be one of the most useful items in your workshop.

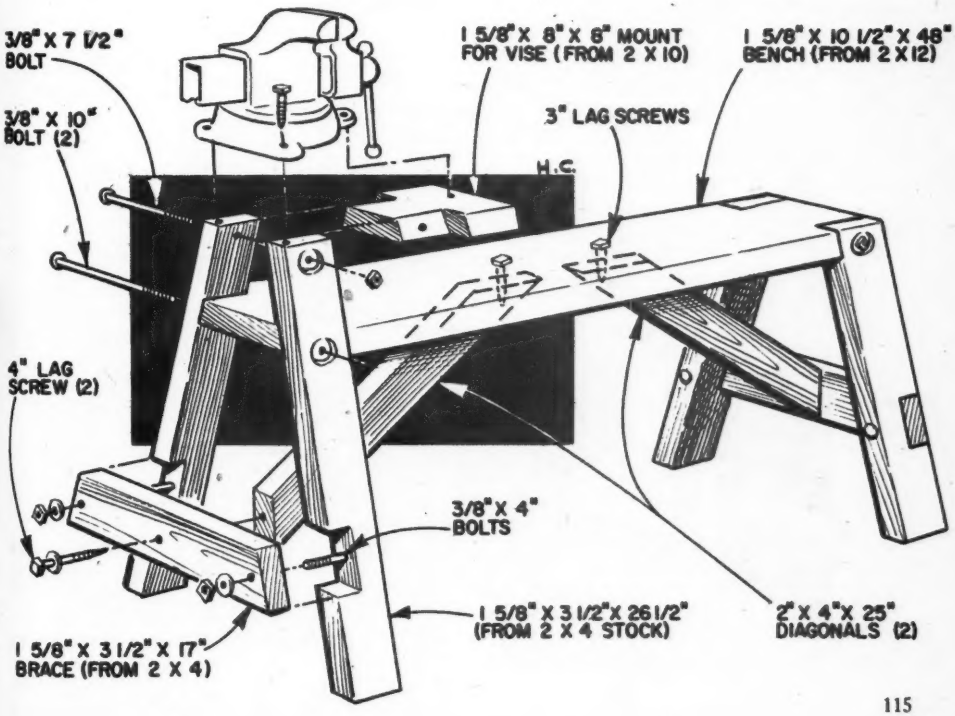
By Stanley Karal



tion the horse can easily be disassembled and put into the trunk of your car if you find that you'll need it for those repairs you are planning for your summer home out in the country.

Lay out the work carefully and be sure that all rabbets are cut accurately for a good, tight fit. Sand all parts and round off all edges of the seat to avoid unwanted splinters. •You can drill holes into the front part of the bench to hold your most commonly used small tools, screwdrivers, pliers, etc. A clamp to hold a portable light for close work can also be installed. •





WEEKEND PROJECT

SPICE RACK

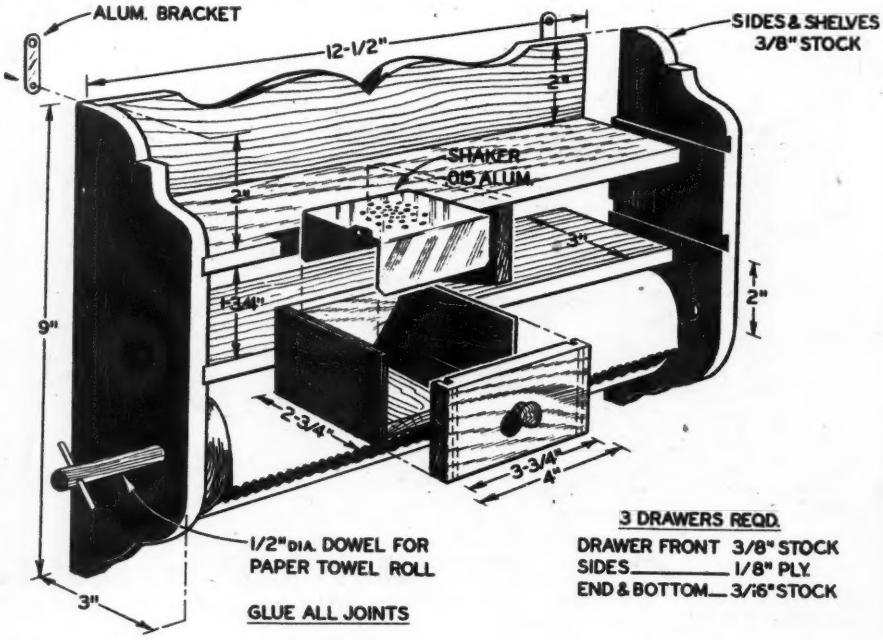
DESIGNED for the kitchen or breakfast room, this combination spice rack and towel holder has built-in salt and pepper shakers.

Stock used is pine or any other soft scrap lumber; the back and sides of the drawers are made from ⅛-in. scrap plywood. A jig saw will easily cut the scallops of the rack body.

After dados are cut into the side pieces, as shown on the drawing, glue the horizontal members and the rear piece into the grooves. While the glue dries, apply pressure by means of a jig made out of two pieces of wood and two threaded rods and nuts.

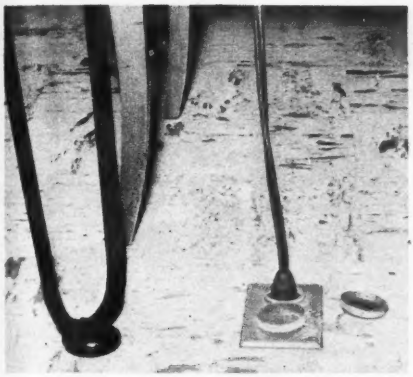
A piece of .015 aluminum sheet acts as the salt and pepper strainer. Drill about two dozen holes, set in an irregular pattern, into the aluminum top and bend it to the dimensions of the drawers, as shown in the sketch.

Finish the set by sanding it all over and applying several coats of clear lacquer, sanding between coats. If desired, it can be stained before applying the finish. •

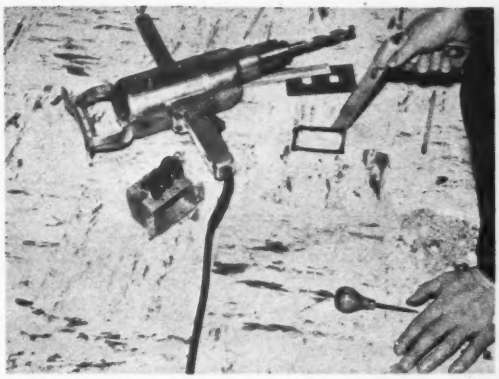


Floor Receptacle

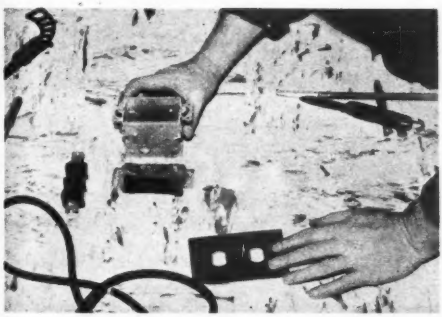
Why not plug into the floor if a masonry wall stops you from installing an outlet in the wall?



Best position for floor outlet is near wall or close to permanent piece of furniture.

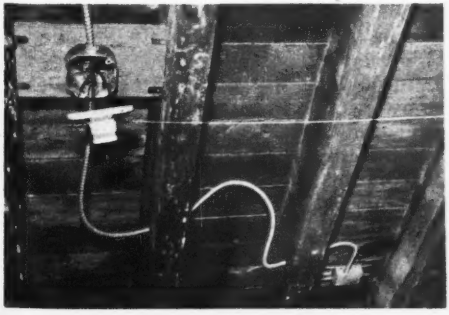


Mark outline of box on floor, drill hole at each corner. Cut away floor as shown.



Steel box for outlet should fit snugly into hole cut through the floor, see above.

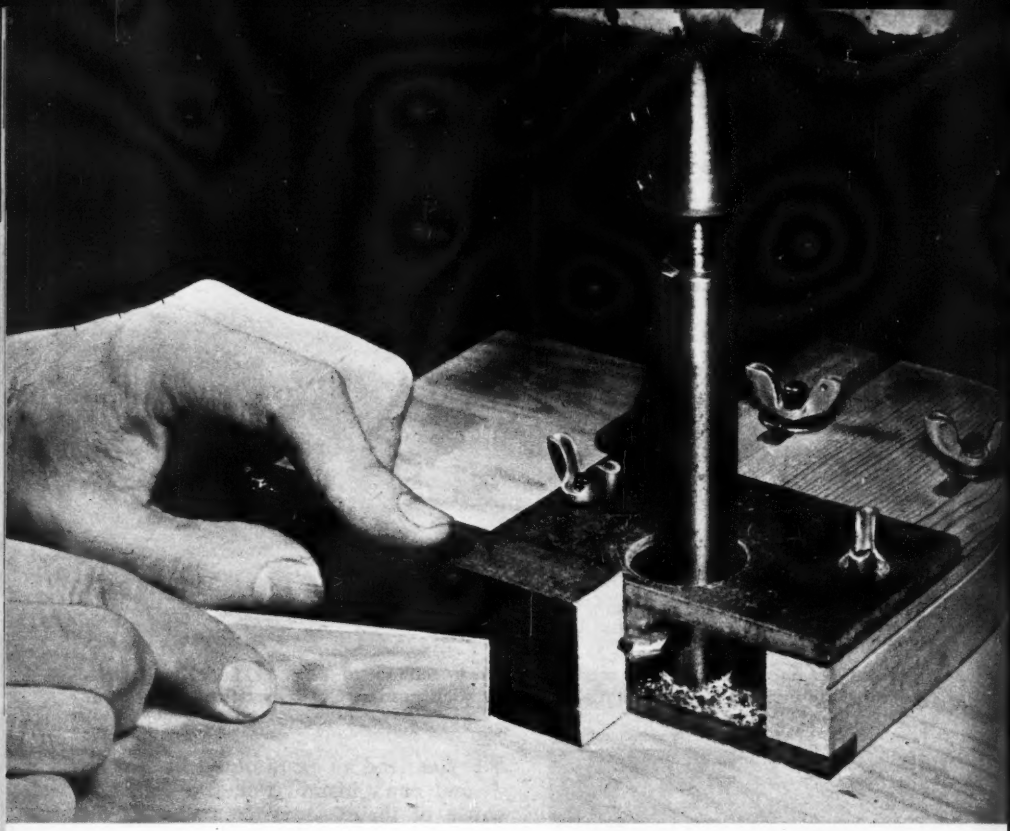
Power is drawn from cellar ceiling light via BX cable to the box, right.



IF you need an extra outlet in a room and can't install it in the wall because of its masonry construction or because you don't want to disfigure the wall, consider a floor outlet. A floor outlet is much easier to install than a wall unit. However, if you do decide to install this type make sure it is of the waterproof (outdoor) type to prevent wash water from entering.

First place the steel box on the floor where you want the "plug" to be. Make sure it doesn't rest over a floor joist. Trace its outline on the floor. Drill a half-inch hole at each corner and use a keyhole saw to cut away the floor area as shown in the photo. You will probably find that you may have to do a bit of rasping before the steel box will pass through the square hole. Don't make the hole too large because if you do the ears of the box will have no floor area for fastening.

After inserting the steel box as shown, proceed to the cellar. Pull the switch or remove the fuse controlling the nearest light fixture in the cellar ceiling. Use No. 12 or No. 14 gauge BX cable to make the [*Continued on page* 164]



Make Your Own Fly Cutter

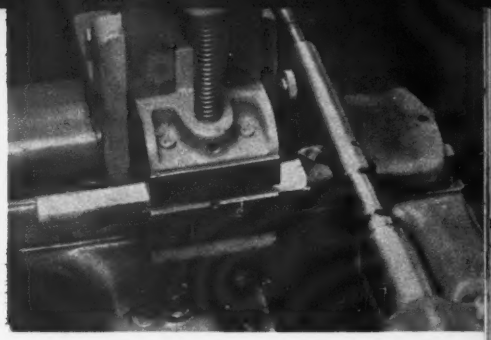
By Walter E. Burton

A FLY CUTTER is a single-point tool which travels in a circular path. Used in a lathe, drill press or milling machine, it can do work ordinarily performed by multiple-tooth cutters, though at a slower rate of speed. Such a cutter is easily made from a high-speed lathe bit, a portion of a broken twist drill or any other piece of tool steel that can be ground to the desired shape.

The illustrated ring-shaped holder is for use on a milling machine arbor. It has two ¼-in. holes for round cutter bits. Ordinarily only one bit is used, but two can be installed. The ring is clamped between collars on the arbor or a keyway can be provided if desired.

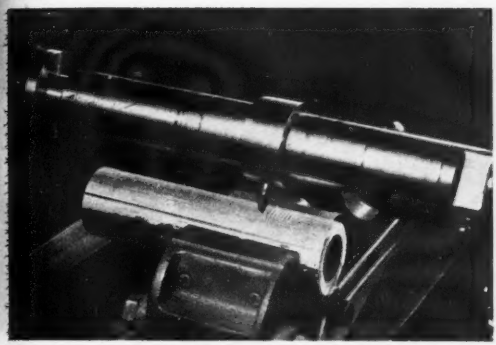
A fly cutter bar like the one shown can be used in a drill press for forming grooves in wood, making molded edges and so on, like a wood shaper setup. In the illustration, one end of the bar is clamped in the chuck and the other is steadied by inserting it into an oiled hole in a piece of ¾-in. plywood clamped to the table. This plywood also serves as a base for a combination guard and guide fence which was built around the bar. Depth of cut can be varied by moving the fly bit in its hole. •

Ring adapter is for milling machine: bar type is used on mill, lathe, drill press.

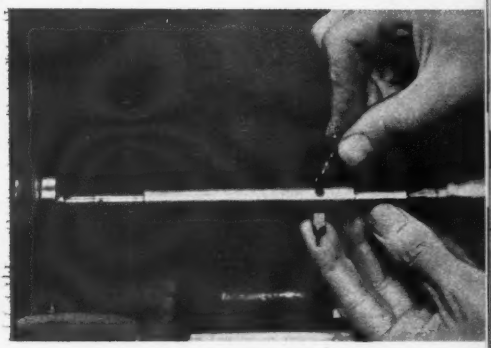


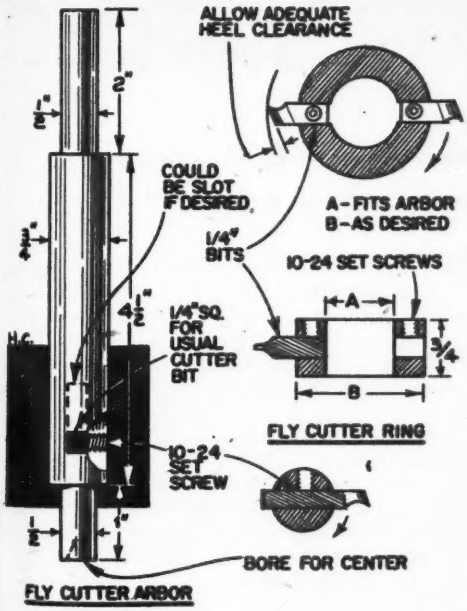
Mounted in lathe, fly cutter slots end of plastic strip held in milling attachment.

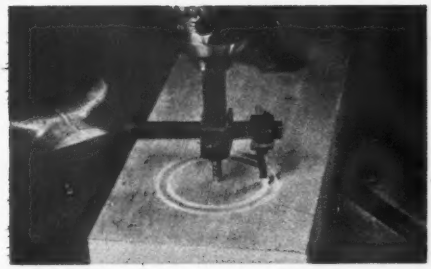
Single cutter is used to mill a series of grooves (rack teeth) in an aluminum tube.



Change or adjustment of a cutter is quickly accomplished by loosening a set screw.

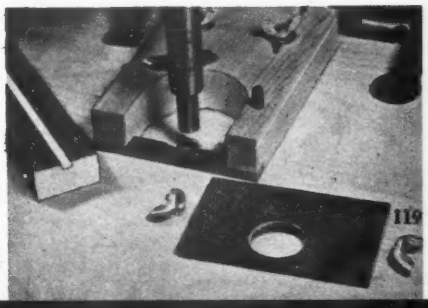


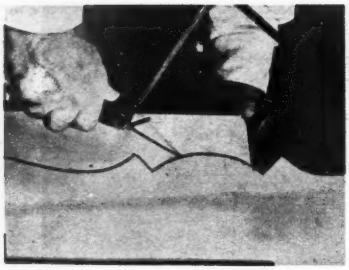




Commercial tool uses a fly cutter to make decorative grooves or cut out large holes.

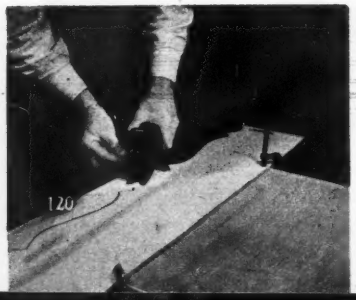
Used in drill press, lower end of holder rests in oiled hole cut in plywood panel.





If necessary, the trim can be cut by hand with a scroll saw.

It takes less time and energy when electric jig saw is used.



VALANCE BOOKCASE

Using basic tools, make this decorative and space-saving unit for a small room.

WHEN you plan a window valance for a small room, consider the possibility of incorporating it with a pair of wall-mounted bookcases. Even if the window is off center, the valance trim tends to balance the whole and you have an attractive as well as functional unit.

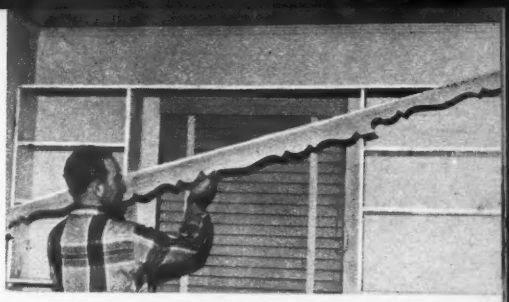
Construction of the unit is simple and the job can be completed with ordinary hand tools. Lumber is low-cost pine, 8 to 10 in. wide, and ¼-in. plywood is used for the trim. Dimensions, of course, will vary with the location.

When the shelves have been built and screwed to the full-width dust board, lift the whole into place carefully. It's best to grasp it at the center

so the screws won't bend and split the end grain of the boards.

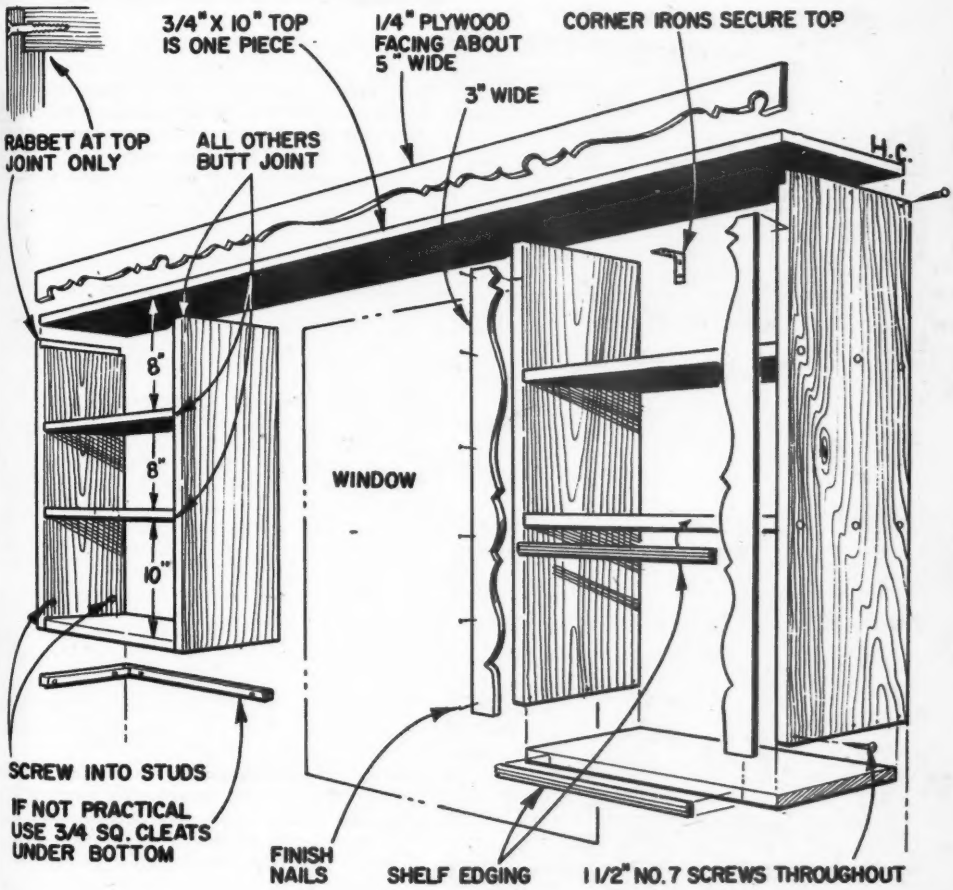
The trim will be more attractive if it is wider across the top than at the sides. The side pieces should be 3 in. wide, the top 5 or 6 in. The essential thing is that the pattern balance at the center opening over the window, so plan that part first and work out toward the ends. Another thing to watch is that the design will enable you to tie in, with natural-looking curves, the inside and outside corners where the top valance meets the four lengths of side trim.

Draw one small section of the design, make a pattern with cardboard or plywood and repeat along the plywood for uniformity. Cut out slowly with a jig saw. The rest is a matter of nailing up the trim with thin brads, countersinking the heads and filling the holes with wood putty.

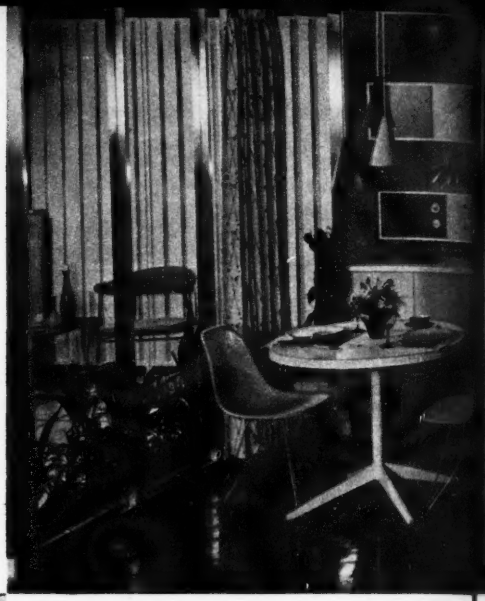


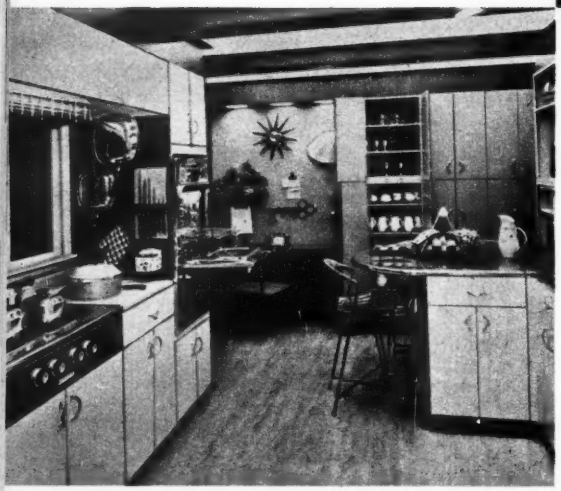
Top trim is raised into place on single board which joins the shelves together.

Place two drapery rod holders at the window section where they will be concealed by the valance trim and you are ready for the final painting. •



TOMORROW'S KITCHENS TODAY





Left: This layout, planned by Youngstown Kitchens, makes most of available space, gives the homemaker all the conveniences she could want. Note the variety of steel cabinets, waist-high oven built into wall.

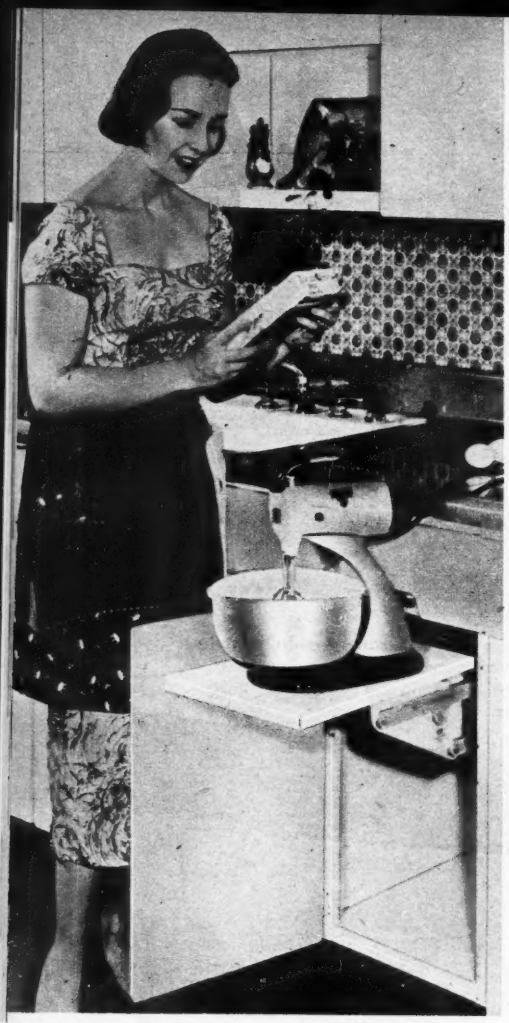
Right: Westinghouse "Cinnamon" kitchen is designed for large family. For $7.50, the company will supply blueprints from which a contractor can duplicate it. Prints for 3 other kitchens are available at $6 each.

Left: Island arrangement in General Electric kitchen includes range with overhead vent. Just about any space and functional requirement can be met with the selection of single and combination units available.

The Frigidaire kitchen. Electric range with French doors is shown at left; mixing center, dishwasher, sink, built-in refrigerator and air conditioner are at rear; automatic laundry is at right. Dining area at left features planning desk and a fold-away sewing center.

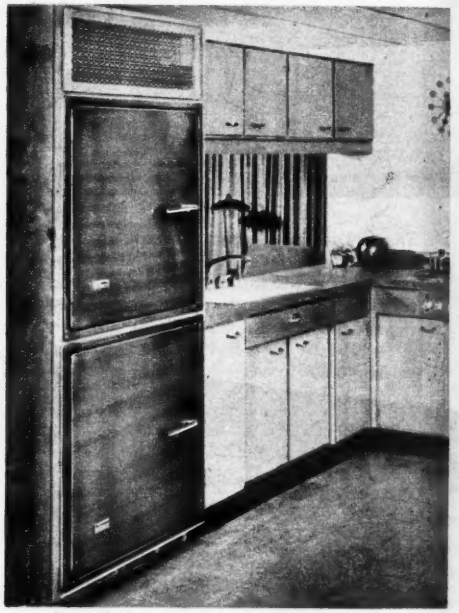
TURN PAGE FOR MORE IDEAS...

TOMORROW'S KITCHENS TODAY



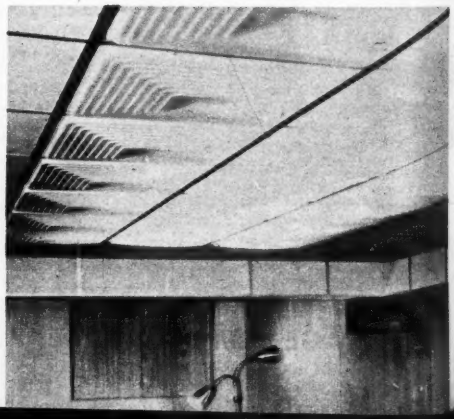
Base cabinet in Kelvinator line permits ready-to-use storage of electric food mixer.

A natural wood finish is popular in cabinets. (Brammer Mfg. Co., Davenport, Iowa)



Accessory featured by American Kitchens is a slide-out flour or sugar dispenser.

Translucent ceiling panels give even light distribution. (Plax Corp., Hartford, Conn.)



Crosley four-unit cooking top fits 30-in. cabinet: utensils are stored just below.

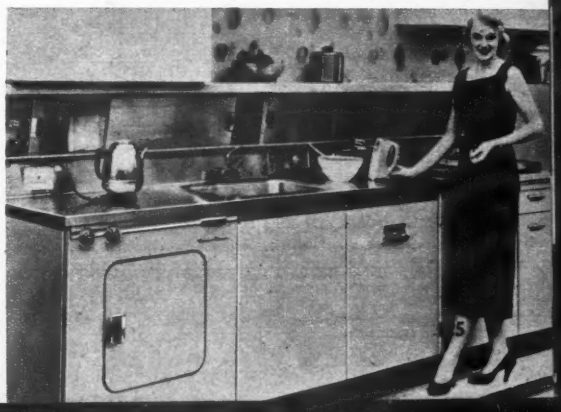
Frigidaire's 24-in. surface cooking unit is built in, folds back when counter is needed.

Hard maple cutting top is convenient between oven and range. (American Kitchens)

Bin-type clothes hamper is installed next to automatic washer in Frigidaire kitchen.

Roomy breadbox by American Kitchens has a sliding rack for biscuits, cupcakes, etc.

G. E. has range, dishwasher, Disposall and washer-dryer under one stainless steel top.



Kitchen Wall Cabinets

An extra set of cabinets is a real joy to all housewives who work in today's small kitchens.

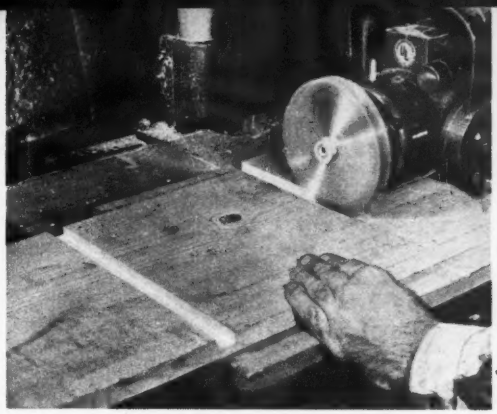
By Ralph Treves

EXTRA storage cabinets for the kitchen always are welcome. Wall units, of particular benefit in homes where the kitchen floor space is limited, usually can be located in an open corner above the refrigerator or other appliances.

Construction of the cabinets is a favorite handyman project and follows a standard, well-developed pattern. Variations in appearance occur in door design or hardware and trim. The saving in cost over ready-made cabinets of equal quality will be considerable.

Materials used for the cabinets shown are 1x12-in. lumber (either clear pine or selected stock with minimum, tight knots), ¼-in. plywood for the doors and lengths of narrow one-inch stock for the face frame.

The usual three-shelf cabinet is 33 in. high. First step is to saw the side up-

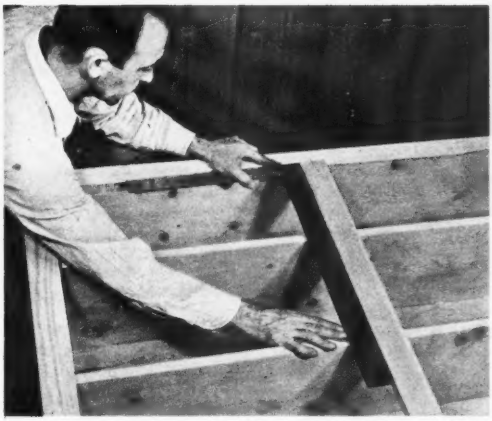


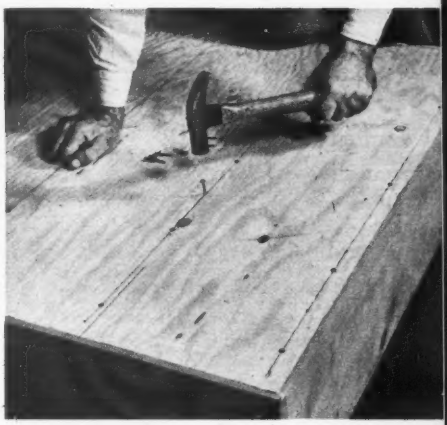
First cut uprights to full height of cabinet, then mark and cut dado grooves on power saw, making each one exactly ¾ in. wide.

Use wood block to tamp shelves into dadoes flush with cabinet surface; assemble with glue and screws for the strongest joints.

It's a good idea to keep a large steel square handy to make frequent checks of squareness during assembly and insure neatness.

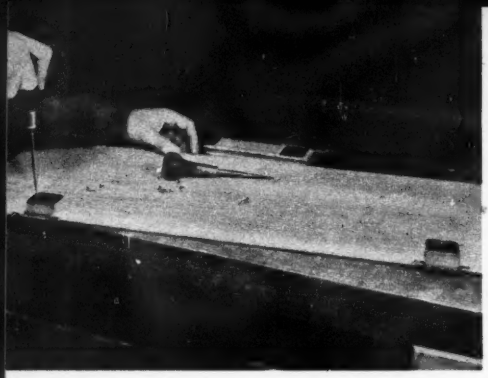
Back panel is securely nailed to shelves and uprights as it holds cabinet on wall. Mark position of shelves in pencil before nailing.





The cabinets are supported underneath by cleat on wall running little less than length of cabinet, held to studs by screws or nails.

Door edges are rounded by first making pass at a slight angle with block plane, then sanding down with a large sheet of paper.

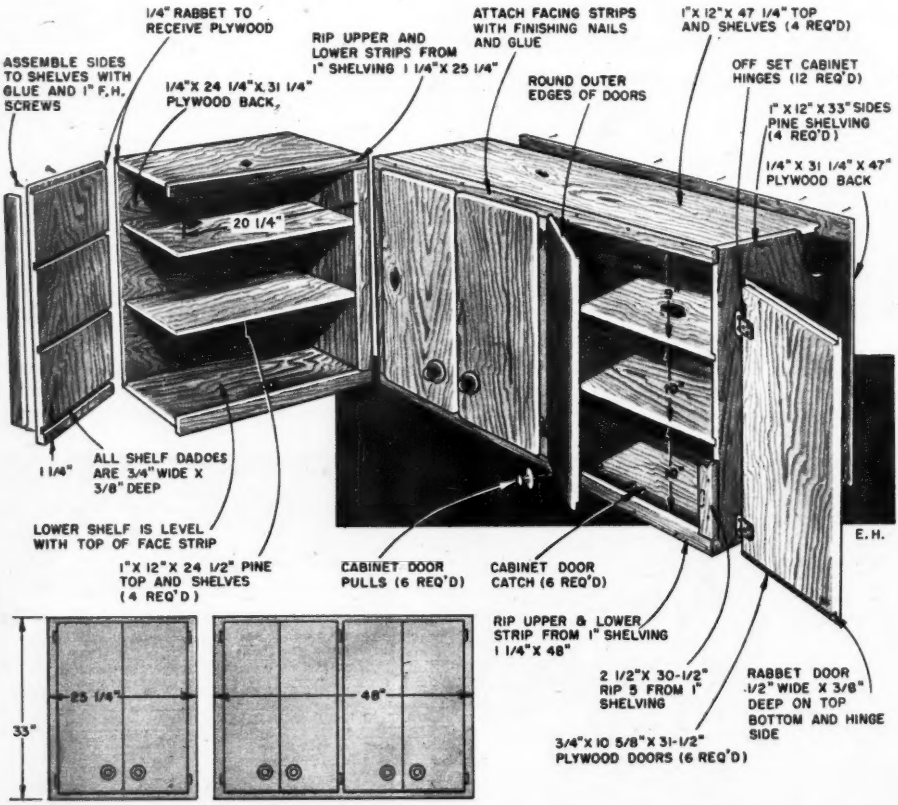


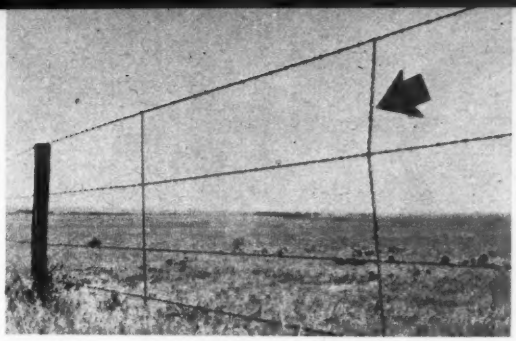
Easy-to-install semi-concealed hinges are fastened first into rabbet along sides of door, then secured to cabinet frame with screws.

rights to full length, then use a dado head on a circular saw to cut grooves the exact width necessary to receive the shelves for a tight fit. The lower dado is 1¼ in. above the bottom; the top has an open rabbet cut over one inch wide in order to lower the top cabinet board at least ½ in. into the sides for clearance in the event that the ceiling is not level. Saw a ¼-in. deep rabbet at the inside back edges of the uprights for a back panel.

Drill holes at the center line of the dado grooves, saw the shelves to length and trim off ¼ in. from each shelf width to provide clearance for the back panel. Assemble the shelves with glue and wood screws. Cut and nail the ¼ in. backing panel in place to hold the unit together.

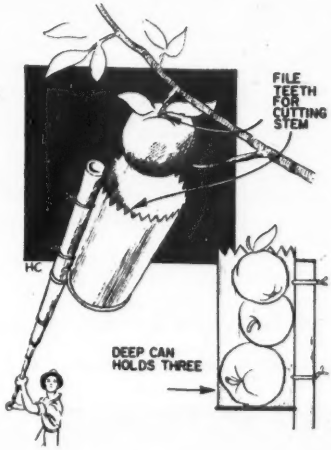
Three pieces of vertical stock are butted in place, one at each outside edge and the other at the exact center, to complete the facing frame and provide a supporting surface for the door hinges. Make sure the butt joints are tightly fitted and nail in the vertical members straight and true. If the facing frame is out of line, you'll have trouble fitting the doors. •





Wire braces (arrow) made from machine-twisted heavy wire save posts on your range fence.

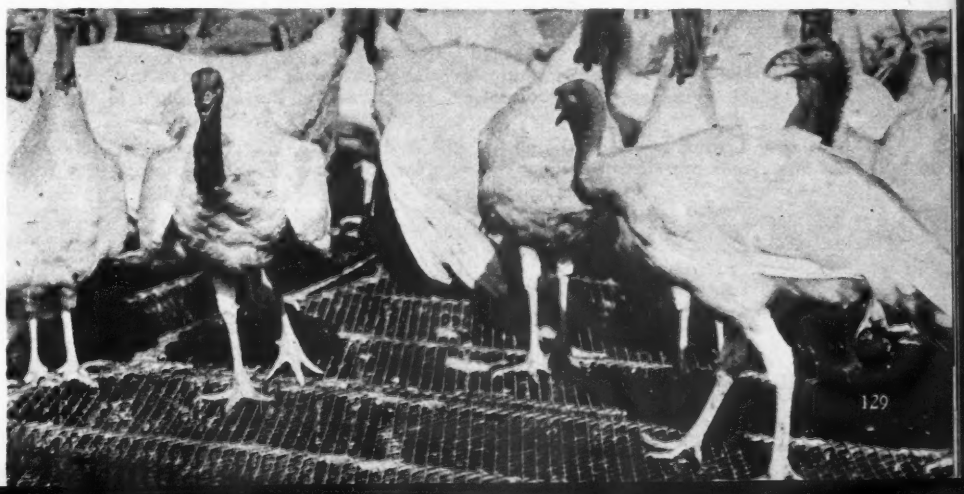
The Farmer's Page



Handy apple picker for the small orchard owner is easily made from an old fruit can.

Pieces of lumber, assembled as shown, make sturdy jack for farm machinery.

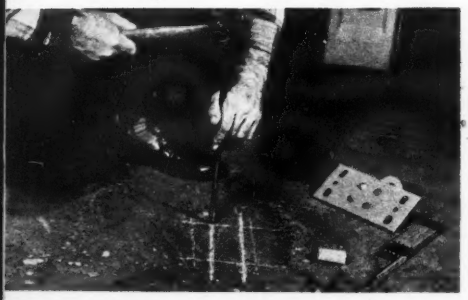
Wheeling Corrugating Co., Wheeling, W. Va., makes expanded metal for use as flooring in turkey pens. The rust-resistant metal simplifies cleaning, keeps birds off the ground.



A long straight board and a level are used to determine the extent of the floor sag.

Floor Sagging?

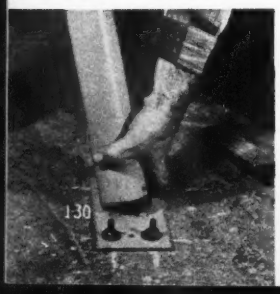
Level that floor by shoring up the joists with telescopic screw posts.



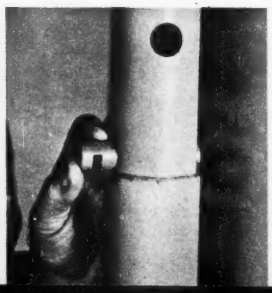
Locate and drill holes for base plate of screw post below the sagging floor joist.

Lag screws or bolts turned into expansion plugs secure the base plate to the floor.

Post fits over lips on base, is held fast by compression.



Telescoping tube is extended and secured with locking pin.



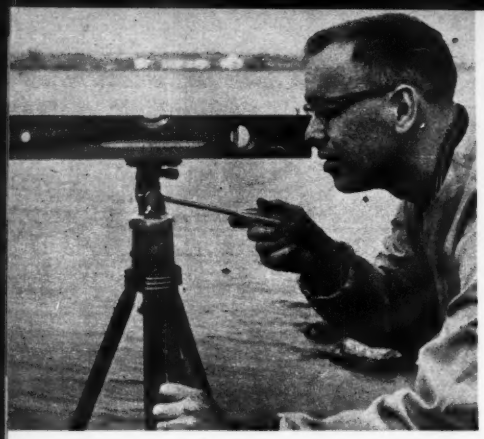
Joist is raised a little each week until the floor is level.

FRESH PAINT TIPS

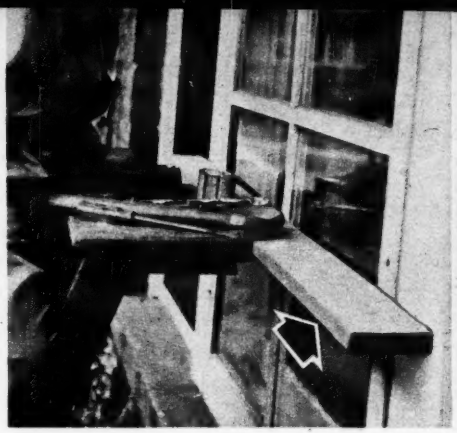
This roof hatch, directly over a bedroom, made the occupants uncomfortable because of the heat absorbed by the black tar paper covering. Heat was deflected by applying two coats of aluminum paint to the roof structure. First step (right) was to brush off dirt and gravel. White paint won't work as tar will bleed.

A piece of hardware cloth and some nails hammered through a strip of wood make a good combination for cleaning brushes, as shown in photograph below.

Gallon paint can is used as a dispenser for paint or other liquids by soldering a brass tube around a hole cut in the lid as shown below.

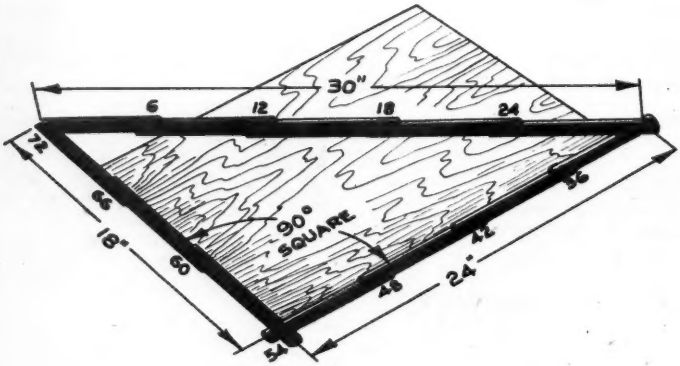


Inexpensive surveying instrument can be made from carpenter's level and two eye hooks, as shown. Ideal for landscaping.



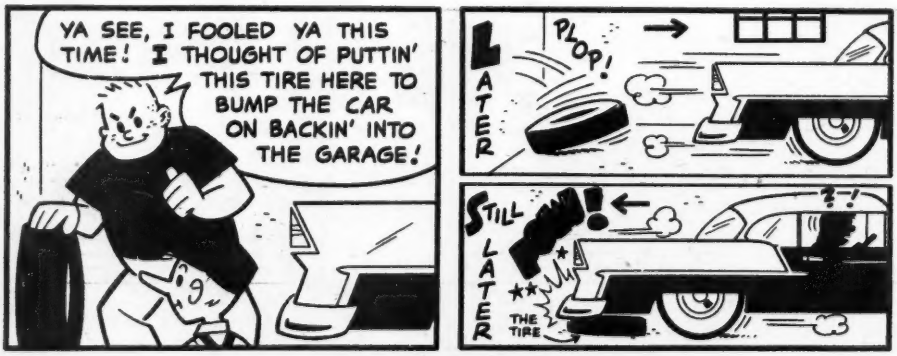
Wooden crosspiece (indicated by arrow) attached to top platform of a ladder makes safety device when working on windows.

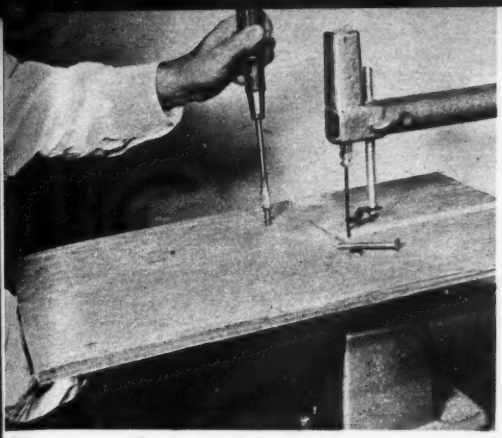
Shop Tips



Drawing shows how a six-foot folding rule may be shaped into triangle to serve as an emergency framing square.

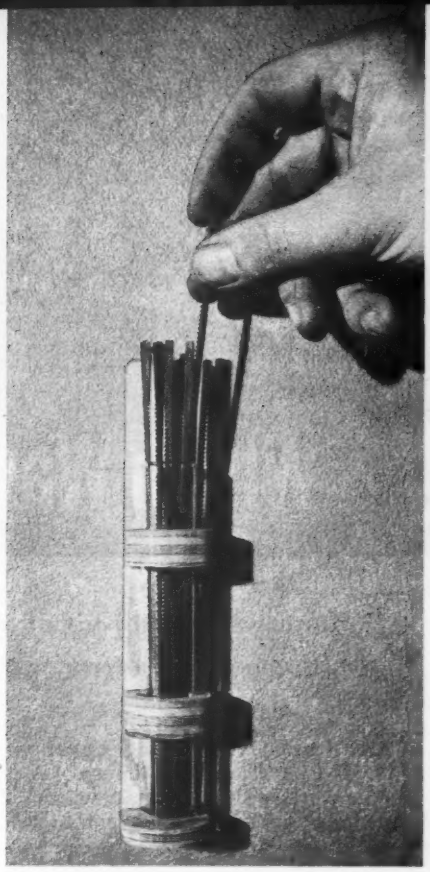
FREDDIE FUMBLES





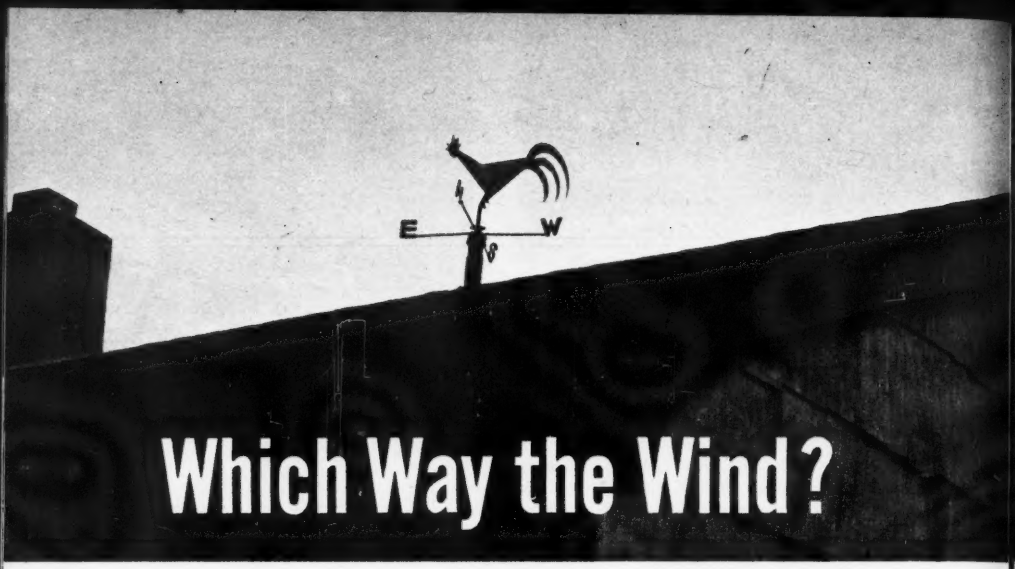
Small area of jig saw table prevents the use of large stock. Make an extension out of plywood and bolt to table.

Avoid scuffed arms and torn sleeves from a rough barrel edge by slitting garden hose in half and putting it over the top.



Handy saw blade holder is made from empty glass tooth brush tube and a few pieces of plywood; it will hold 6½-inch blades.

Send Freddie Fumbles your idea of a good short-cut, time-saver or safety device in your work, whether it be in the home, shop, office or farm. Each tip accepted will be paid for at the rate of $10. Naturally we cannot acknowledge or return the ones we cannot use. However, all will be carefully read and evaluated. (Those which we can use in other departments of MI will be paid for at our regular rates.) Please send in your ideas on a post card only. Address to: Freddie Fumbles, *Mechanix Illustrated*, 67 W. 44th St., New York 36, N. Y.



Which Way the Wind?

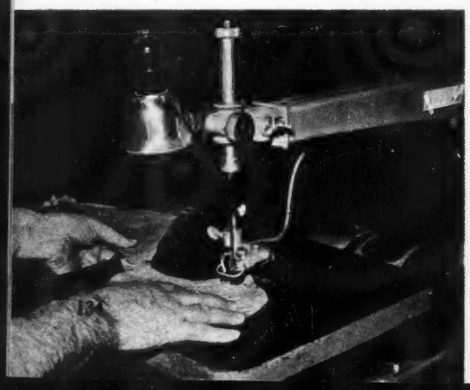
Mounted on the roof of your home, this weathervane will make an attractive silhouette against the sky.

THIS weathervane was designed for a modern ranch-type house. It is sturdy enough to withstand winds of great force, yet sensitive enough so that it will spin to any point of the compass when even a gentle breeze changes direction. The rooster evolved through several drawings, beginning with a very conventional one and ending with the one shown. You can duplicate this vane or have fun creating one more to your own taste.

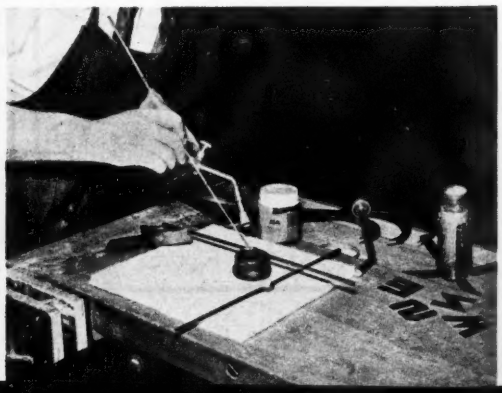
The weathercock design is cut from a 12x23-in. sheet of 12-gauge copper. Trace the design on paper, fasten it to the copper sheet with tape and cut it out with a jig saw. Leftover scrap can then be used to make the four directional letters.

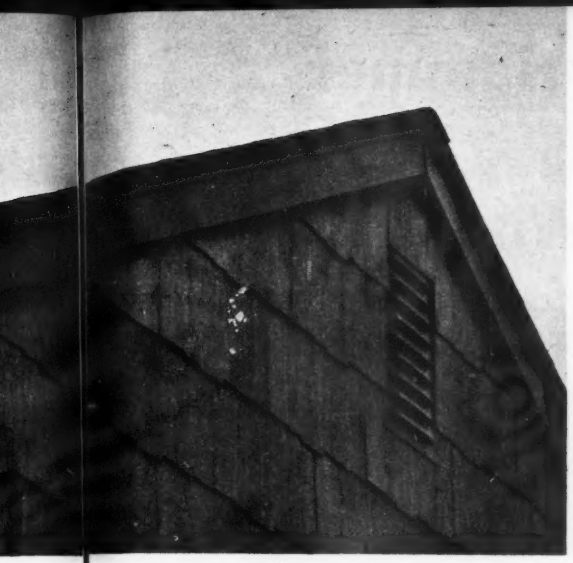
A 16-in. length of ½-in. diameter brass is used for the upright. It is turned down on one end to fit through the bearing hub far enough for a cotter pin hole to be drilled. On the other end, a 3-in. length is offset to the same angle as the legs of the rooster. Using two blades in a hacksaw, this 3-in. length is then sawed down the center to make a kerf as wide as the copper vane is thick. The vane is then mounted in the kerf

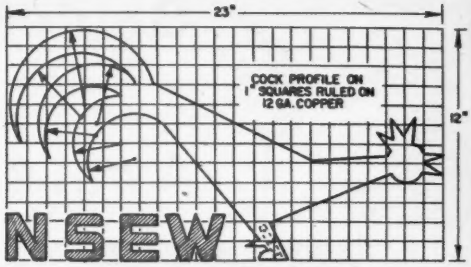
Traced design is fastened to a 12-gauge copper sheet with tape and then cut out.

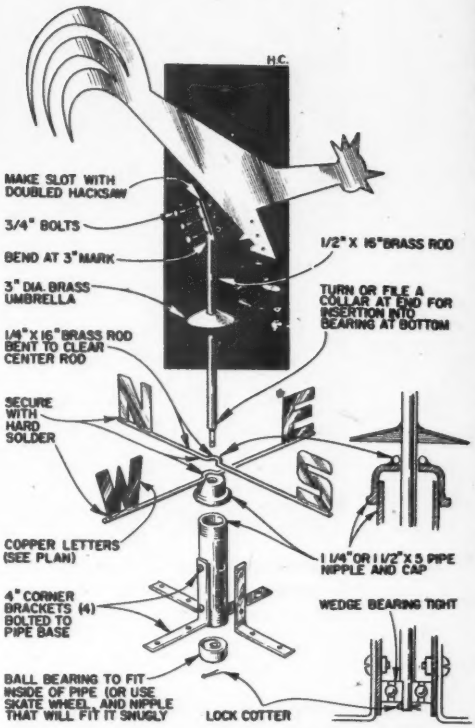


Bent at center to clear upright shaft, direction arms are soldered to pipe cap hub.









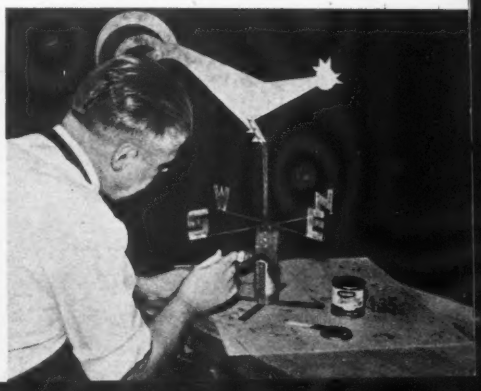
with three No. 8-32 roundhead brass machine screws.

The base is a 5-in. nipple topped with a pipe cap which has a ½-in. hole in the center to serve as a hub for the upright. The two direction arms, each bent in the center to run around this hole, are hard soldered in place. The direction letters, in turn, are hard soldered to the ends of the arms. Four roof mounting brackets are made from 8-in. lengths of ⅛x⅝-in. band iron.

The unit is assembled by pushing the upright down through the hole in the pipe cap hub, then securing the roller bearing (or skate) wheel with a cotter pin. The wheel is wedged securely in place in the bottom of the nipple. •

Cotter pin is used to secure roller bearing wheel to lower end of upright shaft.

The fully assembled weathervane. Two coats of flat black enamel complete the project.

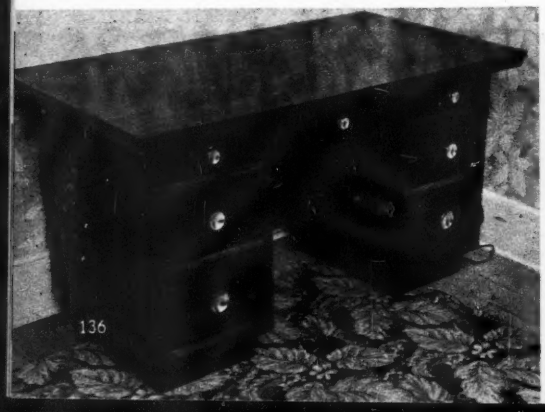


Golden Hammer

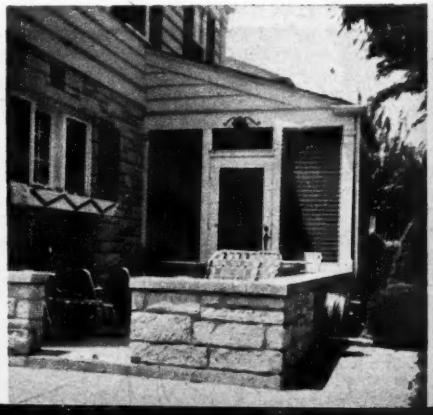
Award Winners

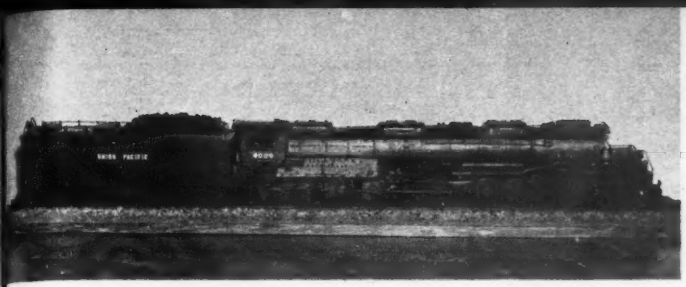
Workshop equipped with nearly every type of power and hand tool is housed in 16x24 ft. shop, built by owner, Robert Payne, Brown City, Mich.

Desk designed and built by 17-year-old Ronald Borges, Hollister, Calif., is made of mahogany, the dovetail drawers are beech and plywood; cost of project was $35.



Patio and rear porch built in nine months of spare time by H. V. Schilden, Skokie, Ill. Walls are lannon stone, supports for roof are 4x4s, boxed in with 1x6 pine.





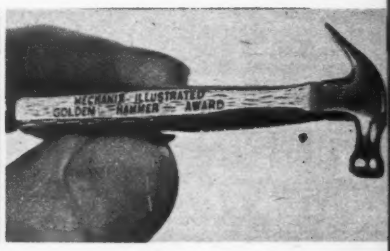
Model of the Union Pacific's Big Boy is built of wood at ¼ in. to 1 ft. scale. It is complete in every detail, took 2½ years to finish. F. Stallsmith, Dubuque, Iowa.

Tractor made from MI plans by M/Sgt. J. R. Wonderley, USAF, is 32 inches tall, uses 1½ hp gas engine; 4 mph top speed. Total cost, including outside welding, was $55.

The following craftsmen have been awarded GOLDEN HAMMER TIE BARS for their projects:

F. H. Hewitt, Warwick, England . . . J. R. Clancey, West Vancouver, B. C., Canada . . . William J. Romero, Lake Worth, Fla. . . . Coleman Courtney, Sumter, S. C. . . . Everett A. Coleman, Van Nuys, Calif. . . . E. S. Glenn, Jr., Summerville, S. C. . . . Richard H. Wiskeman, Jr., Amsterdam, N. Y. . . . Walter L. Jankot, Putnam, Conn. . . . Alec D. Walker, Fort William, Ontario, Canada . . . Robert C. Baker, Casper, Wyo. . . . Kenneth G. Lewis, Fort Myers Beach, Fla. . . . Harold Rigsby, Cicero, Ind. . . . Russel C. Wright, Rockville, Ind. . . . T. Muronaka, Hamilton Air Force Base, Calif. . . . Calvin E. Brown, North Judson, Ind. . . . E. J. Rolison, Graceville, Minn. . . . [Continued on page 170]

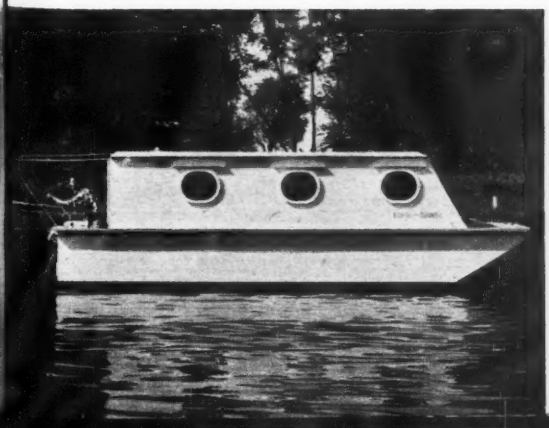
Each craftsman whose project is shown has received a 24 karat gold-plated Hammer and a Workbench Award Certificate. How about sending us a photo and full description of your latest project? If you aren't a winner, you may still receive a 14 karat gold-plated Golden Hammer Tie Bar or MI's Certificate Of Merit. Photographs of you and your workshop are also eligible for an award. Send entries to MECHANIX ILLUSTRATED Golden Hammer Awards, 67 West 44th Street, New York 36, New York. If you want entries returned, please enclose postage.

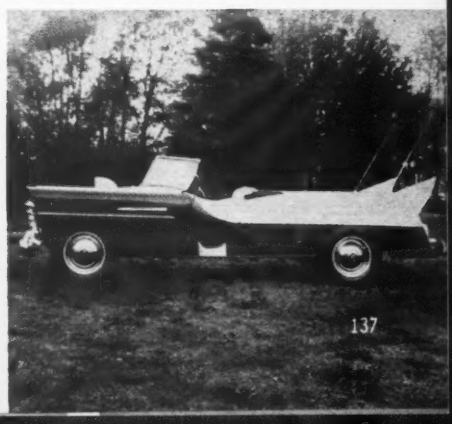


Twenty-five of these Golden Hammer Tie Bars are also awarded each month.

Houseboat built from MI plan B-212 was the first project ever attempted by Don Mackenzie, Alliston, Ont. Craft has done 900 miles of cruising with a 25 hp outboard.

Sports car has '41 Ford station wagon chassis, Ford V-8 motor bored for Mercury pistons; 116-inch wheel base; body is hand made. George Nagele, Cincinnati, Ohio.





1. Lantern, designed for outdoor use, is windproof and weatherproof. It's powered by batteries, throws wide circle of light.

2. Paint fights accelerated corrosion peculiar to aircraft and automobile exhaust pipes, won't burn off under blasting heat.

NEW PRODUCTS

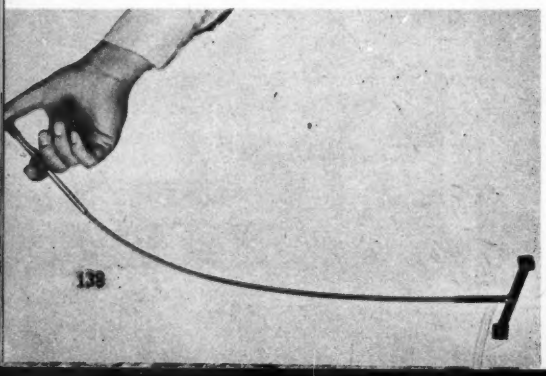
For more information write to:

1. Burgess Battery Co., Freeport, Ill.; 2. Atech, Inc., 3800 Lagrange St., Toledo, Ohio; 3. Everett D. Ricker, Dept. K-6, 422 N. E. 32nd St., Miami 37, Fla.; 4. G. G. Sales & Mfg. Co., 5058 W. Wolfram St., Chicago 41, Ill.; 5. M. & B. Sales Co.,

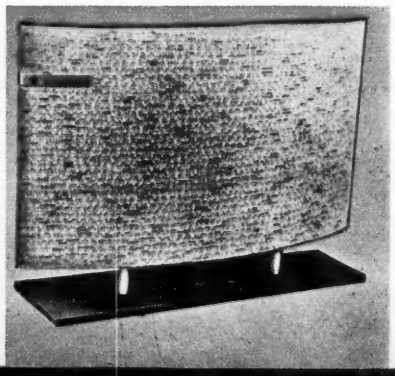
3. Water flow can be varied and shut off by lever on garden hose valve; thumb lock holds setting. The spray head screws off.

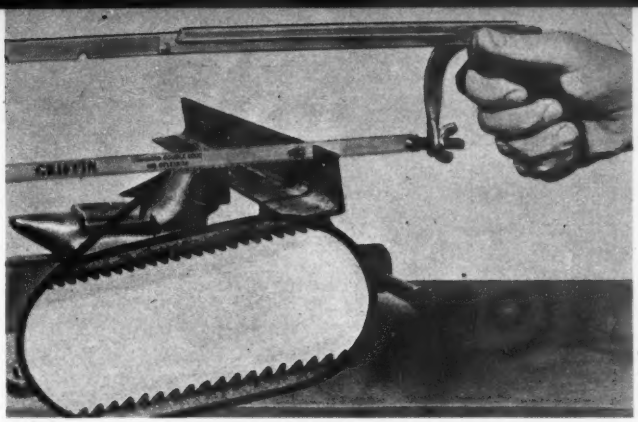
4. Adjustable Trunk-Lid Lash consists of 5/16-in. solid neoprene cord and hardware, holds open lid firm, keeps cargo in place.

5. Flexible pick-up retrieves small objects from otherwise inaccessible places. Release of plunger closes steel fingers.



6. Two new electrostatic speaker models have frequency ranges from 1000 to 20,000 and 400 to 20,000 cps, give true fidelity.

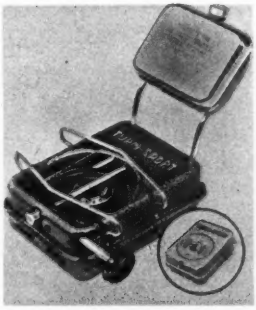




7. New double edge hack saw blade has 18 teeth on one edge for heavy metal cutting, 24 teeth on the other for light sections.

8. This stepladder easel bracket, hooked on a step, can simplify the job of painting large, flat surfaces as shown above.

8211 Cedar Springs Rd., Dallas, Tex.; 6. Pickering & Co., Inc., Oceanside, N. Y.; 7. G. W. Griffin Co., Franklin, N. H.; 8. Max Salisbury Mfg. Co., 2036 Reidmiller, Fort Wayne, Ind.; 9. Bob Mitchell's Products, Dept. MX, P.O. Box 4241, Tacoma Park, Washington 12, D. C.; 10. Reed Mfg. Co., Erie, Pa. 11. A & F Mfg. Co., 1423 28th St., Sacramento 16, Calif. 12. Edward Glocke, Dept. 2, Box 326, Iron River, Mich.

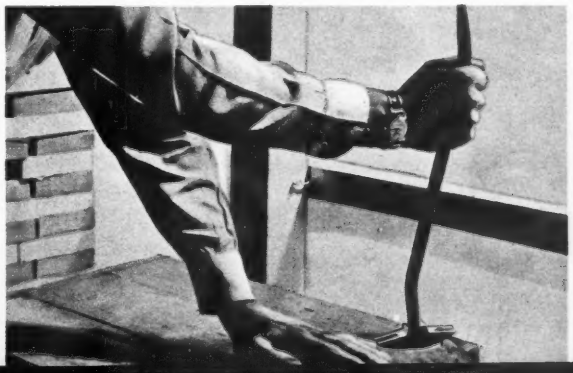


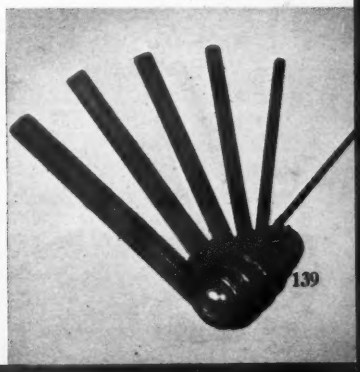
9. Folding stove is compact, weighs only 2 lbs., holds small pots and pans. It can be used 3 hours on a ½-pint tank of fuel.

10. This chain wrench grips and holds any round, square or irregular shape up to 2-in. diameter. Larger sizes are available.

11. Twin-Claw utility bar, used for nail-pulling, ripping forms, prying, etc., also serves as efficient weed-puller in garden.

12. In one unit, Wrenchmaster provides 6 wrenches to fit socket-head screws; comes in leather case slit at back to fit belt.





BOATS and BOATING

POD

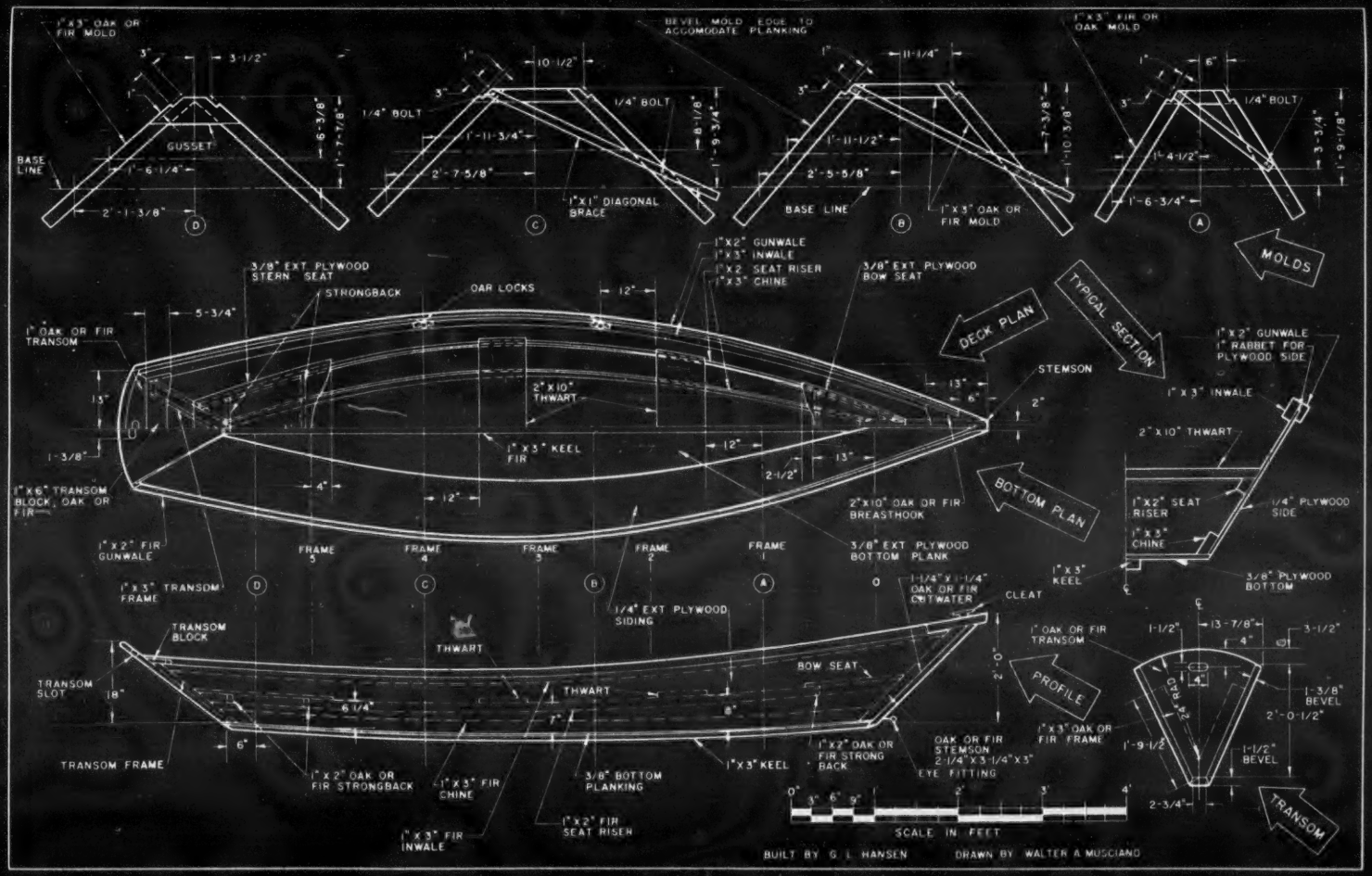
This beautiful 15-ft. rowing dory eases through the water, lets a fisherman sneak up on those big ones.

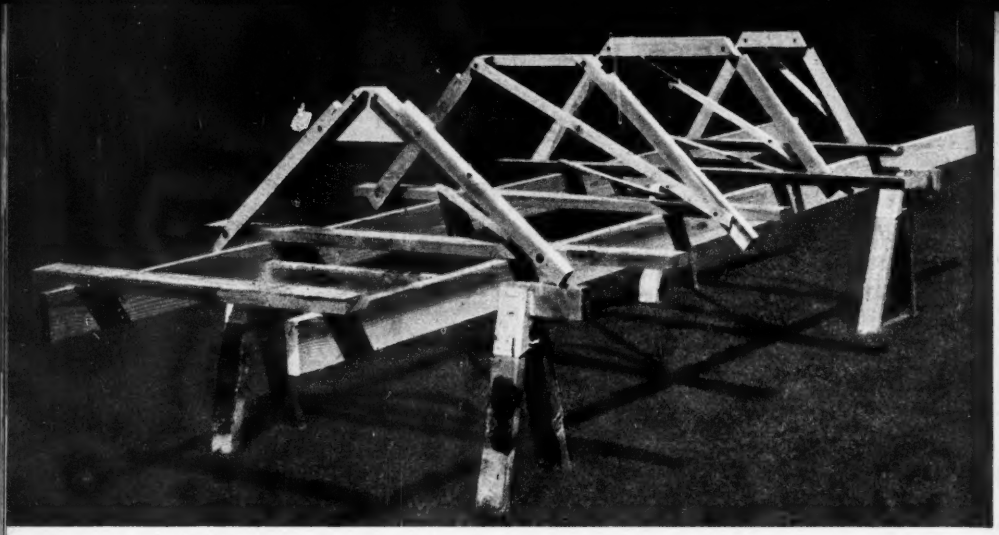
By Gordon L. Hansen

THIS dory is a natural for the man who likes a bit of exercise and appreciates the simplicity and silence of a well-designed rowboat. A narrow bottom, tapered at both ends, enables her to slice through the water with a minimum of effort and flaring sides make her safe and dry in a chop.

Pod, with a beam of 52 in., has an overall length of 15 ft., 5 in. and is 11 ft., 6 in. on the waterline. Three pieces of marine plywood make up the sides and bottom and no frames are required. This makes boatbuilding about as simple as it ever gets and the result is a light, clean hull with fewer places for rot to develop. However, for those who feel better with conventional framing, optional frames are included in the drawings.

In building Pod, the first step is the construction of a building frame. Two sawhorses, about 5 ft. long and 2 ft. high, are set up 9 ft. apart. Two 2x6's, 16 ft. long, are set on edge spanning the horses. These strongbacks are made parallel and level with 36 in. between the inside faces. They are also notched to fit the sawhorses and spiked in place.


1"x3" OAK OR FIR MOLD
BEVEL MOLD EDGE TO ACCOMODATE PLANKING
1"x3" FIR OR OAK MOLD
GUSSET
BASE LINE
1/4" BOLT
1"x1" DIAGONAL BRACE
BASE LINE
1"x3" OAK OR FIR MOLD
MOLDS
3/8" EXT PLYWOOD STERN SEAT
STRONGBACK
OAR LOCKS
1"x2" GUNWALE
1"x3" INWALE
1"x2" SEAT RISER
1"x3" CHINE
3/8" EXT PLYWOOD BOW SEAT
DECK PLAN
TYPICAL SECTION
1" OAK OR FIR TRANSOM
2"x10" THWART
1"x3" KEEL FIR
STEMSON
1"x2" GUNWALE
1" RABBET FOR PLYWOOD SIDE
1"x3" INWALE
2"x10" THWART
1"x6" TRANSOM BLOCK, OAK OR FIR
2"x10" OAK OR FIR BREASTHOOK
BOTTOM PLAN
1"x2" SEAT RISER
1/4" PLYWOOD SIDE
1"x3" CHINE
1"x2" FIR GUNWALE
FRAME 5
FRAME 4
FRAME 3
FRAME 2
FRAME 1
3/8" EXT PLYWOOD BOTTOM PLANK
1"x3" TRANSOM FRAME
1-1/4"x1-1/4" OAK OR FIR CUTWATER
CLEAT
1"x3" KEEL
3/8" PLYWOOD BOTTOM
1/4" EXT PLYWOOD SIDING
TRANSOM BLOCK
THWART
BOW SEAT
TRANSOM SLOT
THWART
PROFILE
1" OAK OR FIR TRANSOM
1-3/8" BEVEL
1-1/2" BEVEL
TRANSOM FRAME
1"x2" OAK OR FIR STRONGBACK
1"x3" FIR CHINE
3/8" BOTTOM PLANKING
1"x3" KEEL
1"x2" OAK OR FIR STRONG BACK
OAK OR FIR STEMSON 2-1/4"x3-1/4"x3'
EYE FITTING
1"x3" OAK OR FIR FRAME
1"x3" FIR INWALE
1"x2" FIR SEAT RISER
SCALE IN FEET
TRANSOM
BUILT BY G. L. HANSEN
DRAWN BY WALTER A. MUSCIANO



The building frame. Longitudinals are notched to fit sawhorses, 2x4's support the molds.

Next the mold anchors are added. First locate station "A" over one of the sawhorses and mark this and the other stations on the upper edges of the strongbacks. A length of 2x4, at right angles to the strongbacks, serves as a mold anchor at each station. Each mold anchor is placed on the amidships side of the station with its edge coinciding with the station line. Spikes and diagonal braces hold them in place. Our draftsman, able fellow though he is, made a slight error in showing the location of these mold anchors. We, in turn, did not catch it until it was too late to change the drawing. However, the stations are located correctly and everything will be fine if you move the forward and aft mold anchors toward the bow and stern respectively so that their edges coincide with the station lines. This, of course, changes the location of each mold so that its amidships side also coincides with the station line.

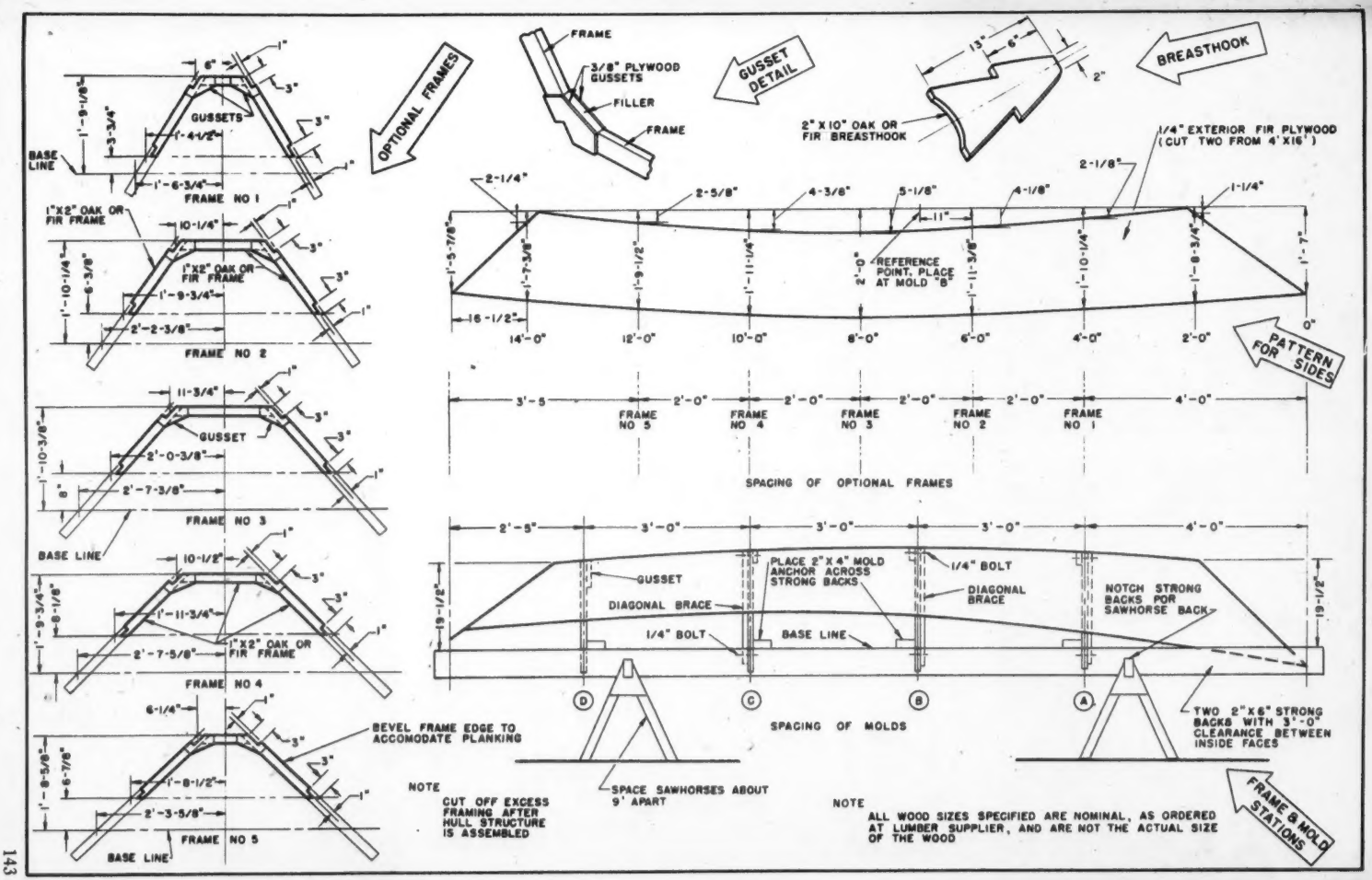
The molds themselves can be made from any 1-in. lumber that is strong and true. Lay them out full size on paper, then transfer the lines to the wood and cut them out and assemble them. Each mold is fastened to its corresponding anchor with ¼-in. lag screws and the upper edge of the anchor determines the base line. Make sure each one is vertical and that its centerline coincides with the centerline of the complete building frame; then bevel the edges to take the planking.

Before going ahead with instructions for assembling the hull, lets get clear on some basic points: Each piece of wood going into the hull is to be treated with wood preservative before assembly; all screws are flathead brass wood screws driven in at right angles to the surface of the wood unless otherwise noted; the screws must also be countersunk $\frac{1}{16}$ in. unless the heads fall in plywood, in which case we reduce the depth to 1/32 in.

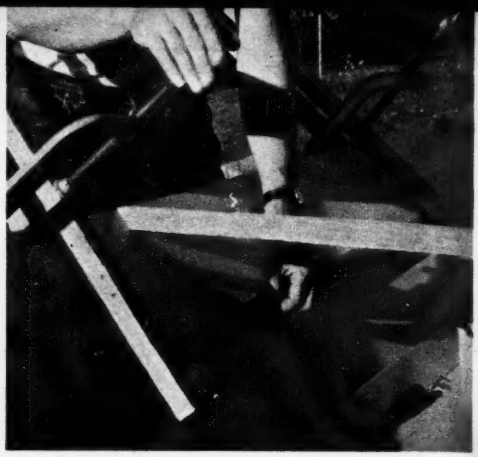
We are now ready to prepare and attach the sides. Lay them out on the ¼-in. plywood sheet and cut them out with a sharp, fine-toothed saw to avoid splintering the edges. Reference points are then marked on each side as indicated in the drawing. Then clamp the sides over the molds with the reference points at station "B."

Fastening the chines to the side planks involves considerable bending so they are soaked with water as they are pulled into place. Be sure to let each chine overhang the plywood enough to allow for a bevel. Then hold them in place with clamps until you drive in ⅞ in., No. 7 screws spaced 6 in. apart.

The stemson must be beveled to a proper fit. Pull in the sides and mark this bevel, then cut it as required. Also trim the chines to butt flush against the


OPTIONAL FRAMES
FRAME NO 1
FRAME NO 2
FRAME NO 3
FRAME NO 4
FRAME NO 5
BASE LINE
GUSSETS
1"X2" OAK OR FIR FRAME
GUSSET
BEVEL FRAME EDGE TO ACCOMODATE PLANKING
NOTE
CUT OFF EXCESS FRAMING AFTER HULL STRUCTURE IS ASSEMBLED
FRAME
3/8" PLYWOOD GUSSETS
FILLER
GUSSET DETAIL
2" X 10" OAK OR FIR BREASTHOOK
BREASTHOOK
1/4" EXTERIOR FIR PLYWOOD (CUT TWO FROM 4' X 16')
REFERENCE POINT, PLACE AT MOLD "8"
PATTERN FOR SIDES
SPACING OF OPTIONAL FRAMES
GUSSET
DIAGONAL BRACE
1/4" BOLT
PLACE 2" X 4" MOLD ANCHOR ACROSS STRONG BACKS
NOTCH STRONG BACKS FOR SAWHORSE BACK
SPACING OF MOLDS
SPACE SAWHORSES ABOUT 9' APART
TWO 2"X6" STRONG BACKS WITH 3'-0" CLEARANCE BETWEEN INSIDE FACES
NOTE
ALL WOOD SIZES SPECIFIED ARE NOMINAL, AS ORDERED AT LUMBER SUPPLIER, AND ARE NOT THE ACTUAL SIZE OF THE WOOD
FRAME & MOLD STATIONS

The transom is installed. Marine glue and screws through the side planks secure it.



The method used to clamp the seat risers. Note the temporary spreaders at the sheer.

stemson. When the stemson has been fitted, fasten it in place with marine glue and 1¼ in., No. 8 screws spaced 1½ in. apart, making sure it is in line with the centerline of the building frame.

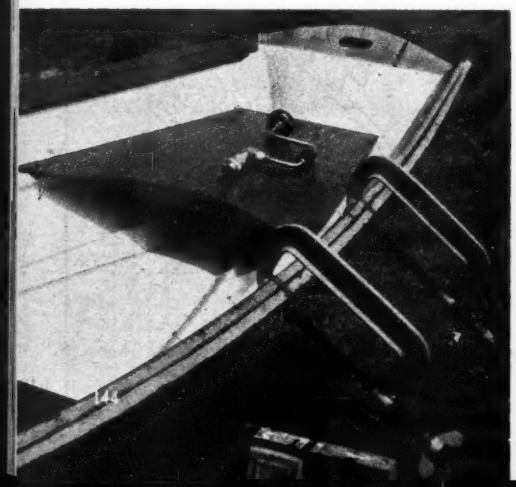
Next make the transom. We built this up of pieces of oak which were doweled and glued, using a resorcin resin with catalyst. Be sure to make allowances for the bevels as noted in the drawing. When the piece is complete, hold it in place on the building frame, pull in the sides and mark the bevel. After cutting this bevel, the transom frame is fitted. This frame is beveled to match the transom and notched to receive the chines. It is then glued and screwed in place with 1½ in., No. 8 screws spaced 3 in. apart and offset in two rows. When this is done, you can place the transom assembly on the building frame for a final fitting and secure it with marine glue and 1¼ in., No. 8 screws spaced 1½ in. apart and offset in two rows.

The next step is to plane the excess material off [*Continued on page* 158]

LARGE-SCALE PLANS

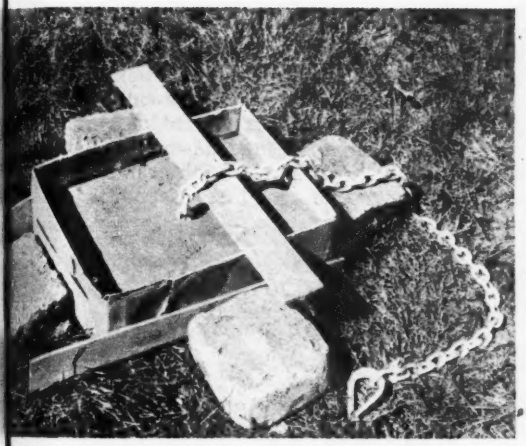
will greatly simplify construction. Send $2.00 to Mechanix Illustrated Plans Service, Fawcett Building, Fawcett Place, Greenwich, Conn. Specify Plan No. B-235, Pod.

Starting at the stem and working aft, the inwales are clamped and screwed in place.

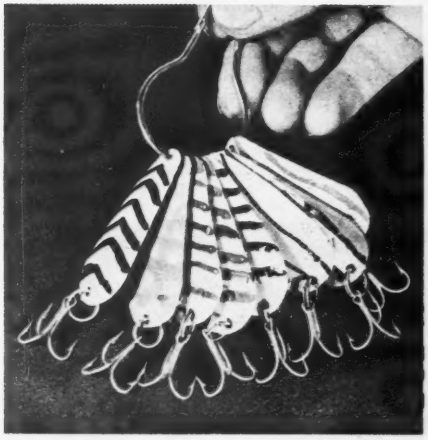


Pod has beautiful lines, moves along with little effort on the part of the oarsman.

BOATING and FISHING KINKS



To make a mooring block, stiffen sides of cardboard box with boards and stone, pour concrete and set galvanized chain in mix.



Fishermen can keep their spoon lures together and prevent them from tangling by stringing them on a shower curtain ring.

On land or water, book matches will stay dry if fitted into one of those aluminum containers used for 35mm film cartridges.

Small compartments built along the sides of a boat make convenient storage places for lures, hooks, tools and other items.

CAR CARE

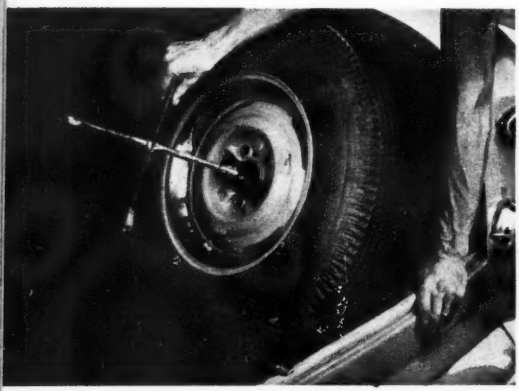
QUIET, PLEASE!

Do you drive to an accompaniment of birdies, squeaks, groans, rumbles?

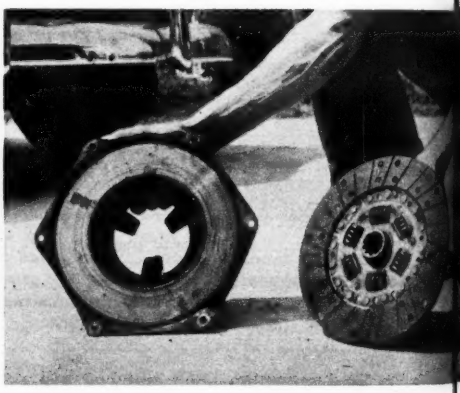
By Frederick C. Russell
Member, Society of Automotive Engineers

PRETTY smooth! That's what every owner likes to say about his car, whether it be the finest on wheels or last year's bird's-nest. Smoothness is that rare combination of conditions in which every moving part of the car is running without vibration. That's a large order. You can have all the major units purring like a cat in a corner and then the picture will be spoiled by a tire slightly worn on its edges. It will offer quite a rumble when the car goes into a gentle curve. Or something under the dash—probably part of the radio set—will start a peculiarly annoying vibration. What should have been smooth sailing suddenly becomes the rough end of a slightly imperfect day.

Webster tells us that vibration is an oscillation. That pretty well defines it for automobiles when you consider how many of its parts are in process of going back and forth or up and down. You probably know how keeping above or



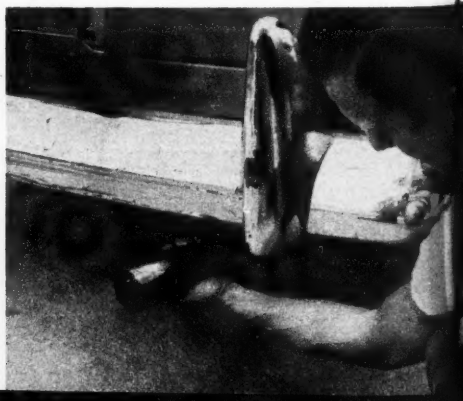
Don't just dump your spare tire in the well. Bolt it in place with lugs provided.



Chattering clutch is generally caused by uneven wear on one or both clutch plates.

Look at what this mechanic found under a car, a peeling muffler causing wind howl.

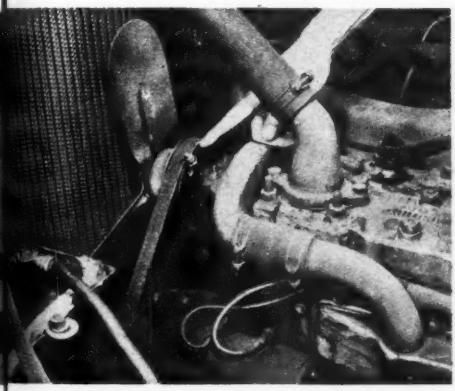
A cool exhaust pipe is a good tip-off that the muffler is not doing its job.



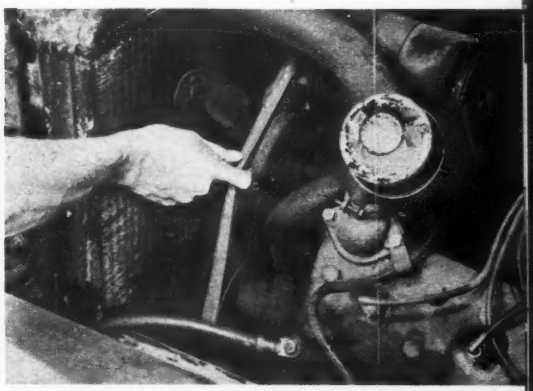
below a certain speed will prevent the engine's periodic vibration from being a pest. But did you ever try to declutch and then allow the pedal to come up again in order to get smoother action if the car seems to be running rough? This has the effect of coupling the engine with the propeller shaft at a different degree of rotation so that the two are in better balance. You can do this with automatic drives too by moving the selector lever to Neutral and then back to Drive again. However, if universal joints are worn enough to let the propeller shaft whip, don't be surprised if the front wheels (balanced or not) develop a bad case of shimmy as the car speeds up over one of the new super-highways.

I have learned to look into the most unlikely places for causes of vibration. It explains why I so often tell owners to take a look at the muffler and tail pipe installation when they complain of odd vibration under certain driving conditions. Modern exhaust systems pick up a good deal of engine shake. If parts are too near the frame or gas tank (as they often are) vibration is the result. It's usually easy to move these parts so that they do not rub against parts of the car, but be careful not to get into other trouble. Exhaust systems must have some freedom of movement.

Mufflers no longer have baffle plates but a trick that worked well in the old days may be useful in some new application. When there was vibration from baffle plate looseness the smart mechanic gave the muffler shell a few whams with a hammer. It reminds me of a door con-

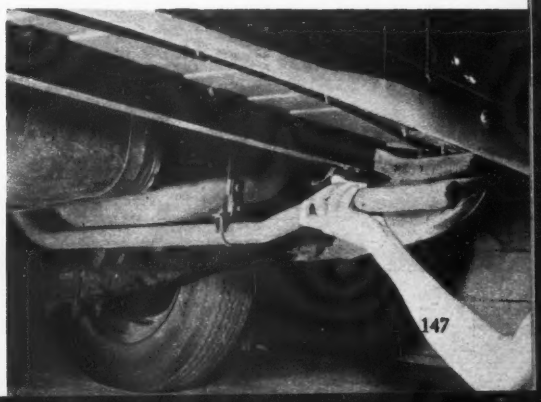


An often neglected grease fitting is the fan bearing. If your car has one, grease it.

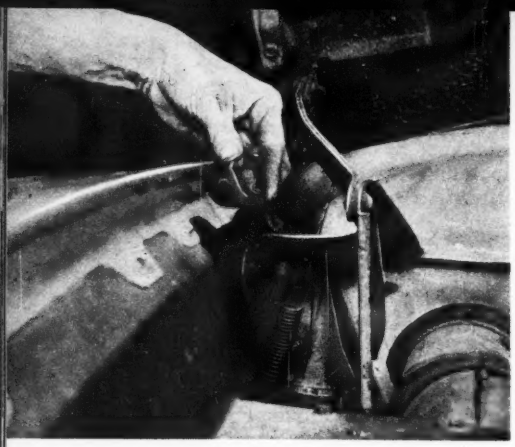


Excessive looseness in fan belt will cause slap and breakage at high engine speeds.

Likely culprits in tracking down car noise are the bumper guards, check them often.



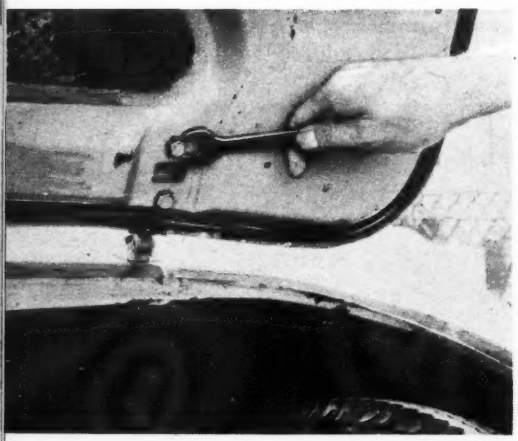
A new tail pipe bracket and hanger brought peace and quiet to the owner of this car.



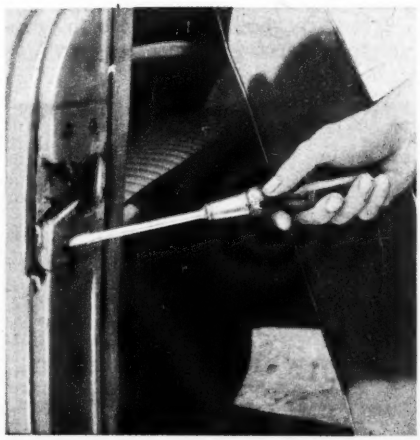
You're bound to get squeaks if any of the rubber bumpers under hood of car are gone.

dition which bothered me for months. I had a bad shake in the door, rapid enough to be classed as a vibration. I mentioned this to the man who was greasing the car one day. "Oh that," commented the greaser, reaching for a rubber mallet. Before I could protest he had struck the door at a certain spot. The door has been silent ever since.

Currently one of the leading annoyances in motoring is vibration from an out-of-round tire or an eccentric wheel. While this is a pounding noise, vibrations are set up in the car, especially around the instrument panel where anything loose can [*Continued on page* 162]

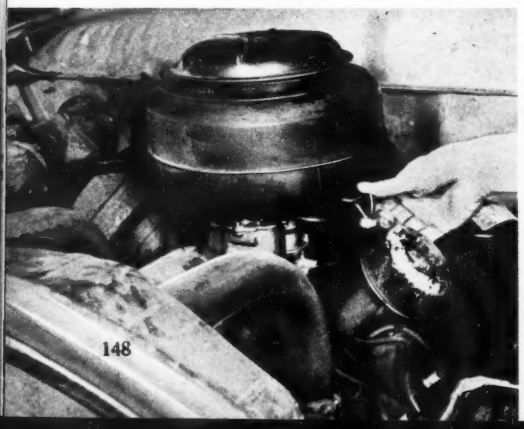


While on a tour of inspection, don't forget to tighten the two trunk lid hinges.

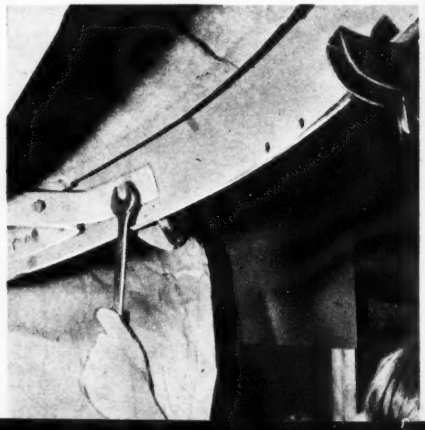


Tighten door latches. A loose door latch will cause door to rattle on rough road.

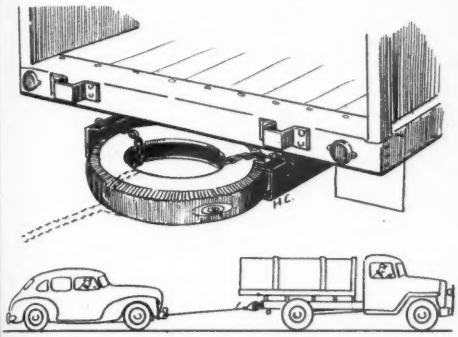
A loose or badly fitting air filter is bound to rattle while the engine is at low idling speed.



A loose bumper or support bar is a prime cause of noise. Check when car is on lift.



CAR KINKS

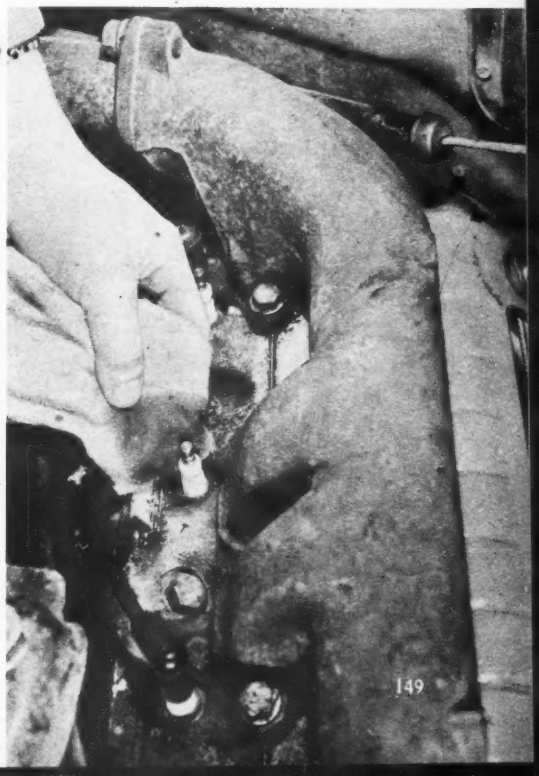


Old tire, chained to rear end of truck as shown, is handy for towing other vehicles; permits you to start without harming clutch.

When switching tires, mark the inside of the hubcap with a grease pencil to give permanent record of tire's previous position.

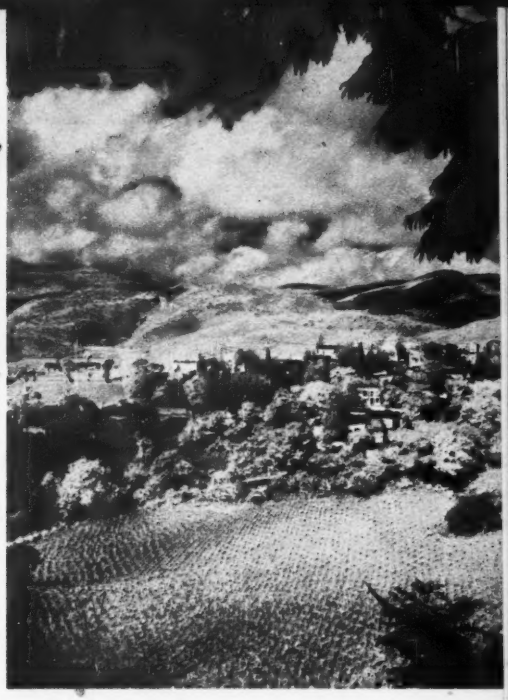
For better winter starting wipe the spark plug insulators with an oil-soaked rag; this prevents spark jumping across porcelain.

Extra trailer hitch attached to the front bumper of car makes it easy to park trailer, enables you to push it into parking space.



MONTHLY PHOTO CONTEST

$10 Award .....Infrared Landscape Taken by B. R. Roseman of Los Angeles, with a 4x5 Speed Graphic; Infrared film and deep red filter; 4 seconds at f-32.



$5 Award .....United We Stand Bob Ackley of Villanova, Pa., took this photo of the UN building with a Voightlander camera; Tri-X film, 1/25th at f-4.5.

$5 Award .....Men Of The Line Edward Scott of Victoria, B.C. used a roll film camera and Tri-X film for this photo. Exposed at 1/200th of a second at f-16.

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope of postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Address entries to: *Mechanix Illustrated*, Photo Contest, 67 W. 44th St., N.Y.C. 36.

1st Prize ($25) ....."Man, What A Dish!" Taken by Jane Cleveland of Jersey City with a 4x5 Graphic and two No. 5 flash lamps; 1/100th at f-22, Super XX film.

"Tintypes" of much better quality than our parents used to know can now be made in your own darkroom.

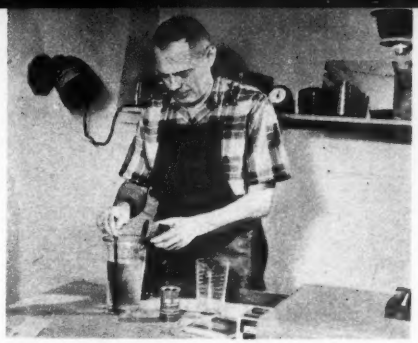
WANNA MAKE A TINTYPE?

WOULD you like to bring back those nostalgic reminders of the past? You can do so with a new printing medium that will yield a picture on metal with quality far beyond that of the "tintype" with its muddy tones.

The entire printing process can be carried out in your home darkroom. All you will need are the sensitized aluminum plates which are the heart of the process. You can buy a kit for $10 which includes plates, developer, fixer and toner, or just a set of six 4x5 plates for $3.50 from the Ampower Co., 150 Broad St., N. Y. C. 4

These sensitized aluminum plates, called Metalphoto were originally designed for making name plates and markers for industrial equipment. However, they can be used to make the tintype shown at the top of this page. Except for the printing and developing, the operation can be carried out under a white light.

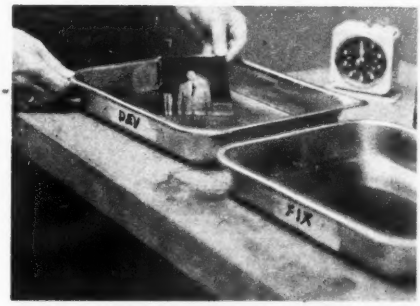
Before starting work, there are several requirements which should be kept in mind. First of all, all solutions should be made with distilled water. Developing, fixing, and toning should be done in stainless steel [*Continued on page* 173]



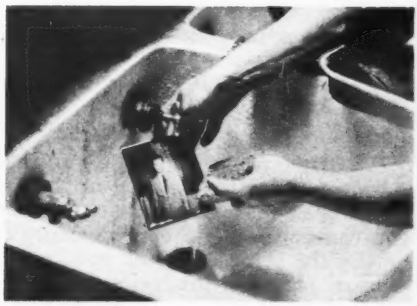
1. Make up developer and fixer solutions.

2. Expose plate to negative in printer.

3. Develop plate: time about five minutes.



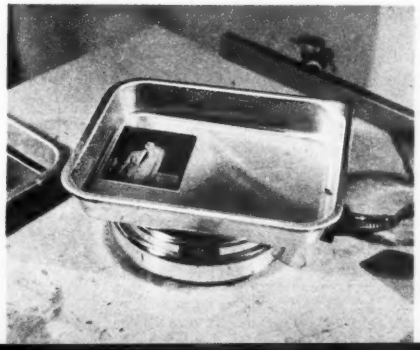
4. After fixing, wash in running water.



5. Prepare the image-toning solution.

6. Place plate in toner for three minutes.

7. Rinse, boil in water for 30 minutes.



8. Final step: polish with a soft cloth.

"AUTOMATIC" CONTACT PRINTER

This printer picks up the paper after the exposure.

IF YOU have ever struggled to get a fingernail under the corner of an exposed print on a conventional printer, you can appreciate the convenience of having the print lifted for you by the unusual platen of this printer.

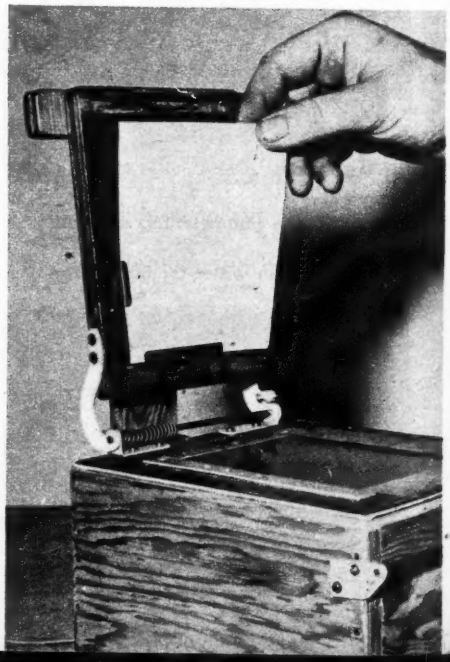
The printer also has a built-in clip which holds the negative in place while printing, automatic margins on two sides, built-in adjustable masks and a clamp to hold the printer securely on the table while in use. The box is small and compact, yet takes negatives up to 4x5.

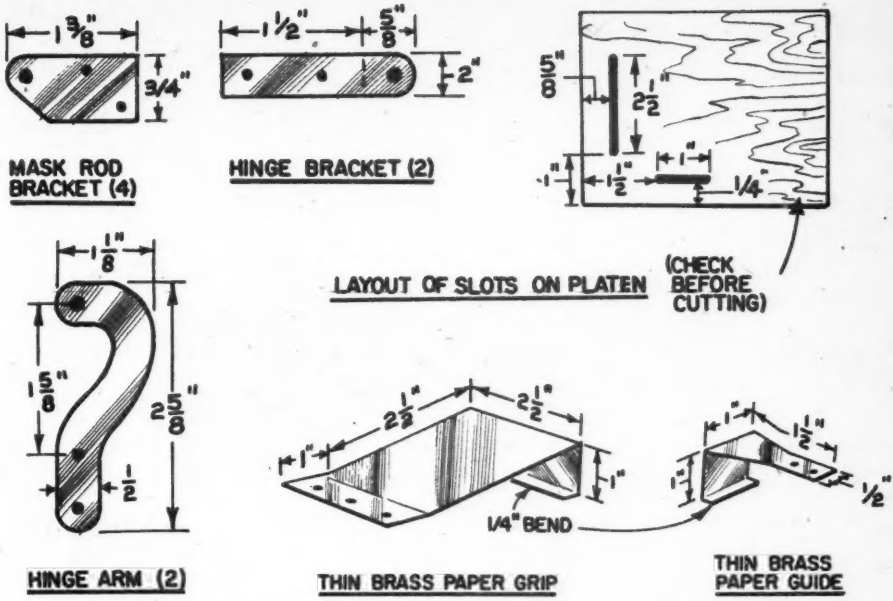
As you will see from the pictures and drawings, construction is not difficult. All wood parts are of ⅜-in. fir plywood. Dimensions are given on the drawings.

Begin by cutting all wood parts to size. Cut a rectangular hole in the top panel and rabbet it to hold a 4½x5½-in. piece of clear glass, flush with the surface. All four side pieces are grooved 1½ in. from the top to hold the sheet of opal glass which diffuses the light. This glass is available from photo supply stores. When this is done, the ends, top and bottom and one side of the box may now be permanently assembled. The second side should be attached with screws so that it can be removed to change bulbs.

A single 40-watt bulb furnishes the light. Because the box is small and the light well-diffused, there are no "hot-spots." The bulb is mounted in a socket

As you raise the platen, the two clips at side and bottom, pick up exposed paper.



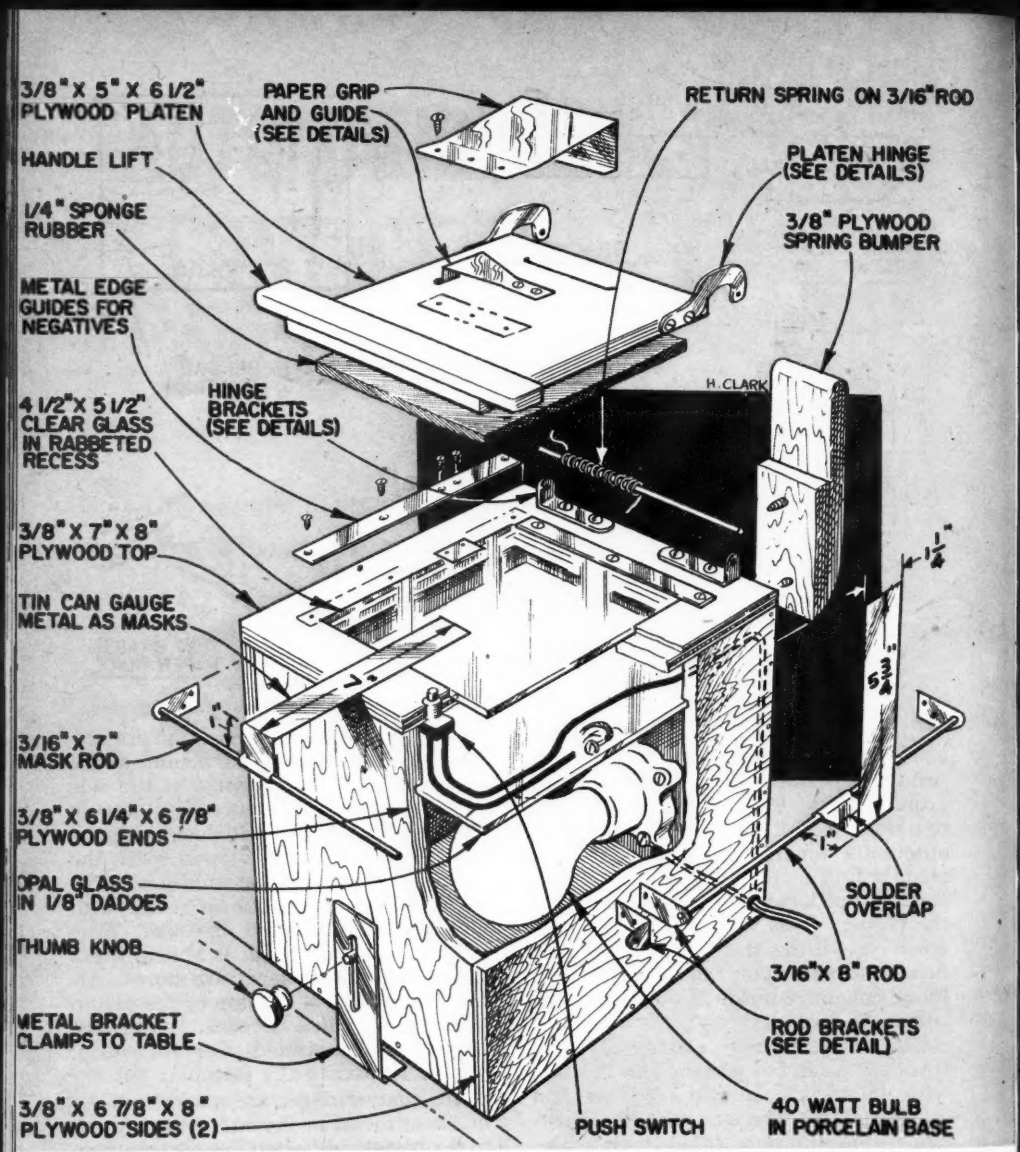


of the type shown in the drawing and should be centered in the box. This printer was built for use with a darkroom timer, so the bulb is simply wired to a short cord. If you are not using an automatic timer, wire the light to a push-button switch of the momentary contact type located under one corner of the platen. This will turn on the light when you bring the platen down and turn it off when you release the platen. Paint the entire inside of the box white, below the opal glass.

The table bracket is made of $\frac{1}{16}$-in. sheet metal and is attached to the box with two 10x32 machine screws and knurled nuts. The slot permits adjustment for different table tops. The bracket may be reversed when it is not needed.

The platen is cut from ⅜-in. plywood. The drawing shows the details for the slots for the paper guide and grip. These are attached to the top of the platen and are bent to pass through the slots. The paper grip, which is the widest, serves as a guide stop when placing the unexposed paper in the printer. It grips and holds the paper in position as soon as the platen is lowered. The paper is released when the grip strikes the projecting bar at the back of the printer as the platen is lifted. The guide at the side of the platen serves only as a stop to "square" the paper. It does not grip, but is spring-loaded to open when the platen is lifted. These guides may be made from any thin sheet metal with enough temper to hold its shape. Perhaps the best material is spring brass sheet, available at hardware stores. Attach the guides to the top of the platen with small wood screws. After the guides are mounted, cement ¼-in. sponge rubber to the platen.

The platen hinges are made from $\frac{1}{16}$-in. sheet metal as shown. Attach these to the platen first, then locate the platen in position over the printing glass and mark the hinge locations on the top of the box. This will be easier if you leave the return spring off until final assembly. The margins on the left side and rear of the printer are fixed and depend upon the position of the platen over the printing glass. Position the platen for quarter-inch margins on the print. A coil spring holds the platen back against its stop when it is open, thus releasing the paper grip. One end of the spring



acts on the platen hinge while the other end is clamped between the print box and the platen stop.

Two half-inch strips of sheet metal form the negative guides. A tab of thin sheet metal, set beneath the left guide as shown, forms the clip which holds the negative securely while the masks are adjusted and the print exposed. Bend this tab up slightly if necessary to make it grip the negative. In order to get a sharp border on the sides where the border is fixed, stretch a strip of colored plastic tape along these two edges of the printing glass. This will mask off the edge of the glass and prevent any stray light from fogging the margins of the print.

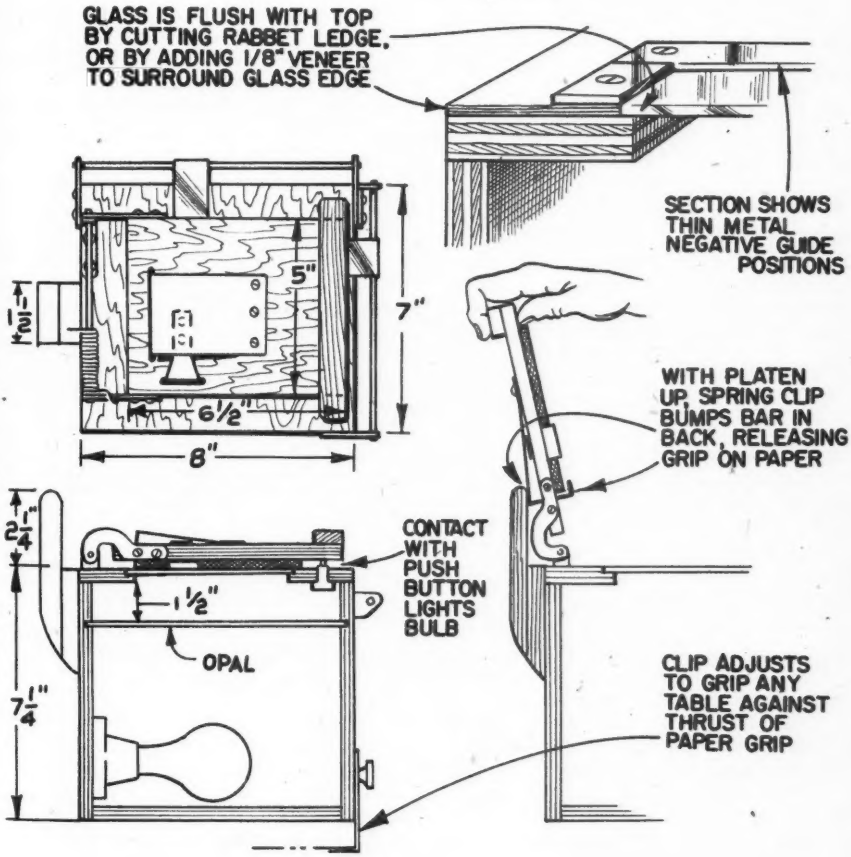
The negative masks are made from strips of sheet metal of the weight found in film pack cases. One end of these is formed around the guide rod and the lap joint soldered to form a sliding sleeve. This is best done if you tin both surfaces

before bending. The guides are lengths of $\frac{3}{16}$-in. steel rod supported in brackets of $\frac{1}{16}$-in. sheet metal. The ends have a reduced diameter to fit into the holes in the support brackets. The outside of the printer may be finished with clear varnish or painted.

Just where you place the printer in relation to the processing trays depends whether you work to the left or the right. A good system practiced by many methodical workers is to keep the printing box to the extreme right of the work table. Next to it, at the left, is the developing tray, followed in order by the shortstop bath and the fixing bath.

It is a good idea though to get into the habit of using tongs in transferring prints from tray to tray. This way you will be certain that your fingers are not contaminated by developing solution or fixer. If you prefer dunking the prints with your fingers, keep a tray of clean water and a towel at the extreme left of the table.

In use, the negative is placed in position on the glass, sliding it under the tab and against the guides. The movable masks are next adjusted to mask the negative to size. With the platen back against its stop the printing paper is placed into the guides and the platen lowered to expose the print. Since exposure times are usually short, no latch is used, the platen is held down by hand. Releasing the platen brings up the exposed print for easy removal—a pleasure! •



[*Continued from page* 144]

the chines, stemson and transom assembly. Take a straightedge, place a level on top and slide it along the chines at right angles to the centerline of the hull. By watching the points of contact, you will be able to locate the high spots and trim them off. Then take the plywood sheet from which the bottom will be cut and lay it on the chines. There should be good contact throughout.

With the sheet resting on the chines, trace the outline of the bottom on it; then cut it to shape. Spread marine glue on the chines, place the bottom in position and fasten it with 1¼ in., No. 8 screws spaced 3 in. apart. Screws near the transom must be driven in at an angle to be buried in the chine. Then shave the edges of the bottom flush with the sides. At this point the keel can be fastened in place with 1 in., No. 8 screws spaced 8 in. apart and offset in two rows. Drive the screws through the bottom into the keel.

Now cut two temporary spreaders and install them between the sides at the sheer. Locate one 6 in. forward of station "B" and the other 6 in. aft of station "C." The hull can then be removed from the molds.

The seat risers are trimmed to fit flush against the stemson and transom frame. They are clamped in position and fastened with ⅞ in., No. 7 screws spaced 6 in. apart and driven in from the outside through the planking. The top edges of the risers must be planed so that the seats lie flush on them.

After sanding and priming the hull, install the two thwarts. Allow very light contact between the ends of the thwarts and the side planks and fasten them to seat risers with three 1½ in., No. 8 screws in each end. The temporary spreaders can now be removed.

The seat risers are notched to a depth of ⅜ in. to take the strongbacks which help support the seats. The strongbacks are cut to fit into the notches flush with the tops of the risers and also beveled so that they fit snug when tapped into place. No fastenings are used between the strongbacks and the risers but the seats are secured to the risers and strongbacks with 1 in., No. 8 screws spaced 9 in. apart. It is best to paint the undersides of the seats before installation.

The gunwales are rabbeted ¼ in. x 1 in. to cover the edge of the plywood, then clamped in place on the side planks. Make sure the gunwale is at the right height to be faired into the transom, then drive in 2 in., No. 10 screws horizontally through the gunwales into the transom. Screw the gunwales to the stemson temporarily so the clamps can be removed.

The ends of the inwales are cut to butt flush against the stemson. Clamp those ends into position, flush with the top of the gunwale and then work aft, clamping and screwing as you go. Use 1¼ in., No. 8 screws ¾ in. below the upper edge of the inwale and spaced 6 in. apart.

The after end is cut and beveled to fit flush against the transom proper, the transom frame being trimmed to just below the inwale.

Tap the gunwale along its full length with a mallet to make sure the plywood is seated in the rabbet and then drive in 1¼ in., No. 8 screws ½ in. above the lower edge of the gunwale, spacing them 12 in. apart.

Up at the stem, trim off the gunwales at the point where they converge naturally with a vertical cut at right angles to the hull centerline. Measure back along the centerline 6 in. and make a similar cut to a depth of about 1¾ in. In determining the exact depth of cut, remember that the upper face of the breasthook will have to blend with both the inwale and gunwale and its lower face will have to blend with the gunwale. Next cut in from the apex of the stemson, parallel to the sheer and approximately 1¾ in. below it, over to the bottom of the vertical cut. Bevel the breasthook as required and screw it to the stemson with two 3 in., No. 14 screws. Also drive two of the same screws through the gunwale and inwale into the breasthook. Next cut the forward edges of the side planks and keel flush with the leading edge of the stemson and then cut and bevel the cutwater and fasten it with 2 in., No. 9 screws spaced 6 in. apart.

The transom block is fitted with the lower face flush with the lower edge of the

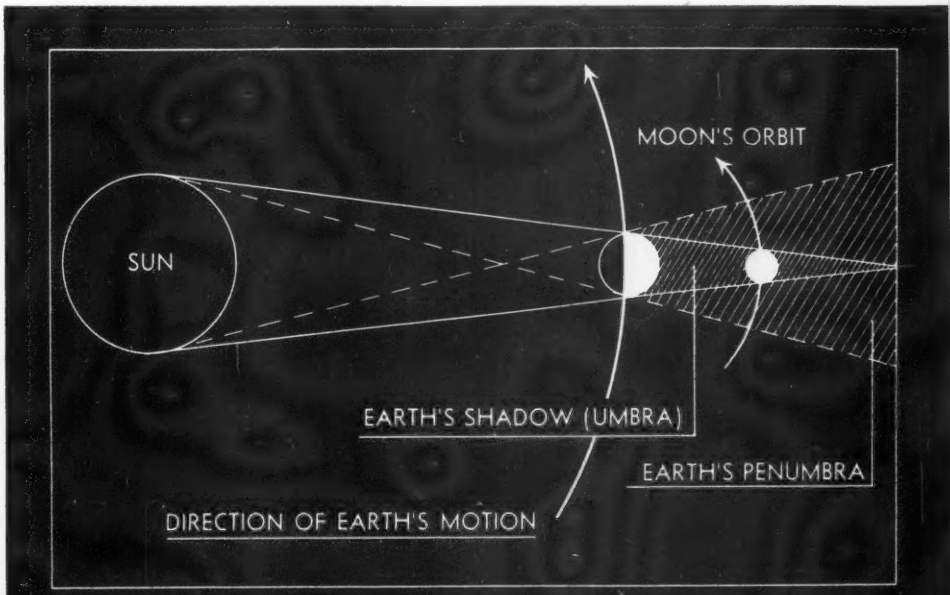
[*Continued on page* 164]

Photo and drawing courtesy American Museum, Hayden Planetarium

THE LUNAR ECLIPSE

A TOTAL eclipse of the moon in its entirety will be visible across the continental United States on Saturday night and into Sunday morning, November 17-18. This is the first important sky spectacle to be seen in this country since the partial lunar eclipse in July, 1954.

Eclipses of the moon occur when our satellite, in its revolution around the earth, passes directly through the long conical shadow which the earth casts out into space. While not as dramatic as a daytime solar eclipse, lunar eclipses are nevertheless interesting both to observe and photograph. Binoculars afford the best visual view, revealing the true three-dimensional roundness of the moon, espe- [*Continued on page* 173]



Conquest of Space

The Strange Nozzle of Mr. DeLaval

By G. Harry Stine
Viking-Aerobee Operations Engineer
White Sands Proving Ground

THE conquest of space will depend upon a very strange device. It is the simplest and most efficient of all heat engines and the least understood. It has no moving parts.

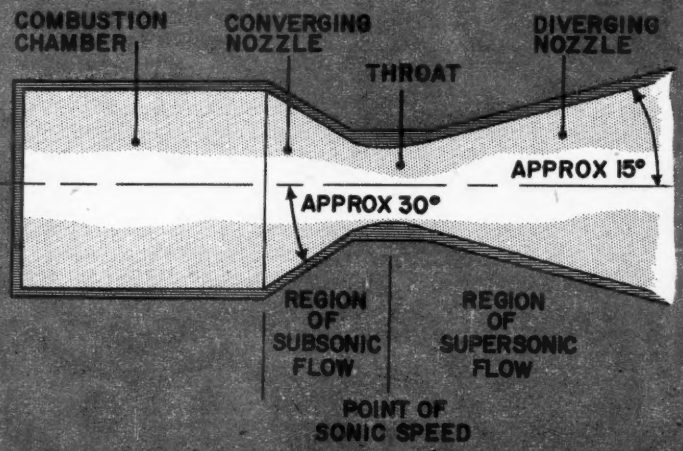
We are talking, of course, about the rocket motor. Until some genius comes along with an anti-gravity device, it looks as though we'll have to use the rocket for our space jaunts. In earlier articles, we have discussed the types of rocket motors, the different forms of their fuels and oxidizers, the ways of delivering the propellants to the combustion chamber, and how to keep the walls of the combustion chamber from melting. Now let's consider the heart of the entire rocket, the combustion chamber and nozzle.

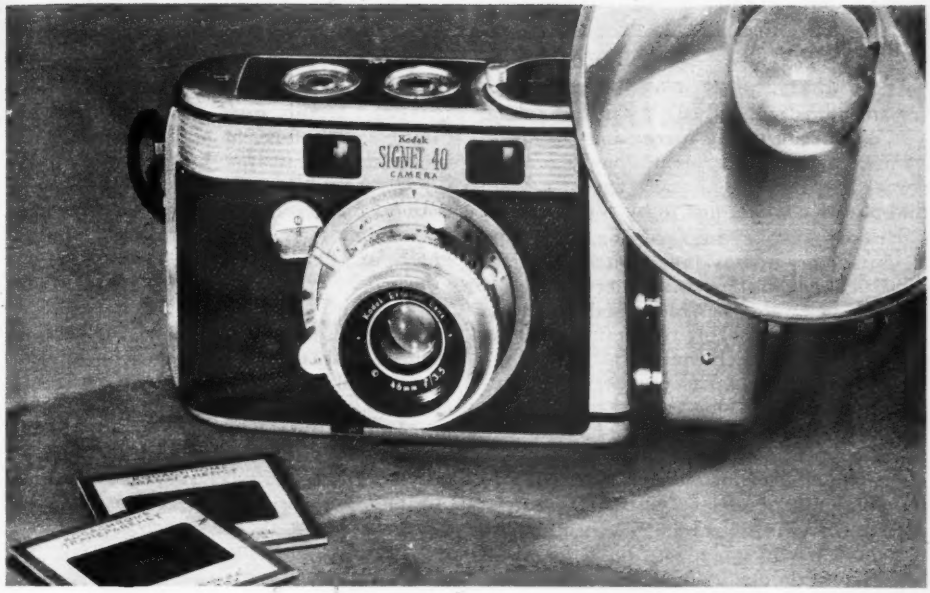
Everyone knows that a rocket works. If you have not see the big ones at White Sands, you have fired the common, Fourth of July solid-propellant skyrocket. Out comes a gush of flame—and the rocket moves.

The rocket is an engine that uses molecular motion directly without any intermediate parts. What do we mean by this? Let's have a look at Isaac Newton's famous Third Law of Motion—For every force there is an equal and opposite force. A small mass ejected at a high velocity in one direction will cause the object ejecting the mass to move in the opposite direction.

A rocket does not move forward because the gas streaming out of it is pushing on the air. A rocket works because there is an unbalanced force at work. If you will think of a closed bottle with gas in it under pressure, you can understand that pressure is exerted equally on all sides. But open one end, and there is an unbalanced force caused by the pressure being relieved on the open side. This is the same principle that a rocket uses, and one reason [*Continued on page* 172]

The modern rocket motor is a simple device for increasing molecular speed to the supersonic.





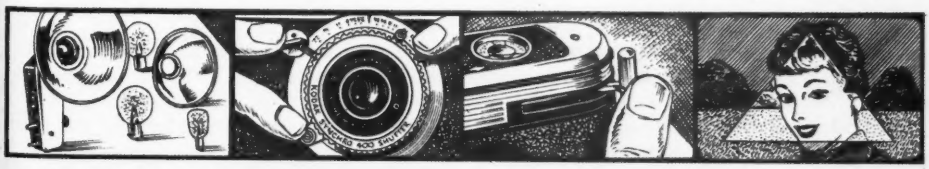
Step out with the New Kodak Signet 40 Camera

It's the color-slide camera specially designed to get the most out of today's fast Kodak Films and the new midget flashbulbs!

You'll step out with confidence with a smart new Kodak Signet 40 Camera. It has the picture-taking range and smooth handling ease that lets you "get" color slides that others miss!

Ask your dealer about the Signet 40's superb *f*/3.5 Ektanon Lens and Synchro 400 Shutter, 1/5 to 1/400 second. Have a look at its exclusive dual-reflector flash system. Discover for yourself how fast you can sight, focus, shoot, and advance the films—with *all controls* at your finger tips.

The Kodak Signet 40 Camera, complete with flasholder and dual reflectors, is only $65.



Dual reflectors for M-2 or #5 and #25 bulbs

Fast, handy, positive finger-tip controls

Rapid thumb-lever film advance

Combined rangefinder and viewfinder

Price includes Federal Tax and is subject to change without notice

EASTMAN KODAK COMPANY . . . Rochester 4, N.Y.

Kodak
TRADE-MARK

[*Continued from page* 148]

pick up the shock and throw it into the dash for amplification. Unlike a shimmy which you can break up by increasing car speed or decreasing it, there's no handy remedy for a bad tire except to replace it. And an eccentric wheel *has* to be replaced.

Brake noise always means vibration. Because the drums make such effective loudspeakers, things do not need to be far off the beam to be troublesome. Often the noise is due merely to the drums being too thin, a very likely state of affairs if they have been cut down to correct an out-of-round condition. One way to remedy this is to use heavier lining, but the idea doesn't always work. Worth trying is a cocktail of copper, silver and lead powders in a solution available at auto accessory stores.

How the vibrations resulting from riding in your car can affect you have not been adequately determined, but efforts in this direction are already under way. Pioneering in this field is the Bostrom Company of Milwaukee which is conducting research into the problem in an effort to establish a definite connection between a rough ride and some of modern man's ills such as internal and back disorders. It is believed by many doctors that vibrations from riding have an adverse effect on vision, metabolism, respiration, heart beat and body temperature. In addition, there's the psychological angle. Things are a lot worse for the driver if he has to listen to a body rumble, the whine of rear-end gears or the shaking of the engine in loose mounts.

Some minor vibrations can be easily remedied. Typical is the loose air cleaner which may set up quite a jingling. You'd be surprised how much engine vibration is due to loose valve covers. It is particularly true of cover plates for side-valve engines. Owners of overhead valve engines usually keep the covers tight in order to check oil losses which are easily seen. But on side-valve engines the plates are well down below eye level and pretty much out of mind. Some odd vibration can be expected from the fan belt if pulleys are not in line. In fact belt squealing, which is rather chronic with some motors, usually can be traced to this cause. Check also for frayed edges and excessive slack.

The pitch of the fan's blades also is important. If this pitch isn't right the fan may be very noisy at high speeds. Don't forget that a fan that has the right blade pitch at the beginning of the car's career may become troublesome because of damage in removing the radiator, replacing the engine or merely working around the engine. A fan blade can also loosen up and set up quite a racket.

Along similar lines there is possible trouble with the fans for the car's heater and the defrosters. These ventilating fans are usually in places when noise is amplified by sheet metal and ducts. A buzzing noise you may hear around the driving compartment probably comes from the automatic transmission's torque converter and means it needs more oil. A generator regulator in need of attention will also vibrate.

Whenever vibration develops in the area of the pinion and ring gears it is smart to drain off the old lube and try a new filling. It may even be well to change the grade of lube before deciding upon a readjustment of the mesh of these gears. Conventional transmissions often jump out of gear because of excessive vibration in the drive line or rear end. I've seen a drop in rear tire pressure remedy this trouble.

You'd hardly suspect overheating being related to vibration but I recall one trip in which I was forced to put up with a loud squeal under the hood. I finally found that steam around the water pump was trying to escape and that the impeller was setting up a calliope effect. As soon as the overheating condition was checked the pump ceased to complain.

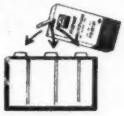
Luckily, vibration in the car usually hints of trouble. It's a most convenient alarm system. •

ATOM-BOMB SHELTER

Combine practicality and security by engaging in this two-in-one project which includes a double garage and a sturdy concrete shelter built into one corner. Shelter may be used for storage or as tool room. For your copy of the complete plans which include diagrams and full instructions, remit $1.00 to *Mechanix Illustrated* Plans Service, Fawcett Building, Greenwich, Conn. Plan No. HJ-18.

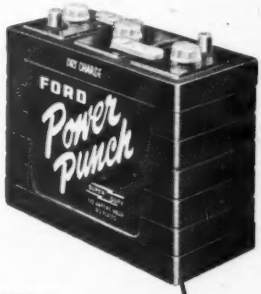
Now! Ready for your Ford – THE DRY-CHARGE BATTERY WITH THE LONGEST LIFE

"See the difference?" says Donald Droste, Ford's Chief Battery Engineer. "You get more life-building fluid in a Ford Battery and that means a longer life. And it holds more fluid because its walls are made of such strong materials they can be made slimmer—yet give you the *same* strength as the *thicker* walls of ordinary batteries."



"They're factory fresh, too, for an even *longer* life. The life-building fluid of the new Genuine Ford dry charge battery is packaged separately and added *when you buy it.* That means there's no power loss in storage . . . and many extra amp-hours of battery life for your Ford."

All Genuine Ford Parts are made right to last longer in your Ford!



Genuine Ford Batteries, like *all* Genuine Ford Parts, are made to the *exact* specifications set by the men who first built your Ford.

In addition, *all* Genuine Ford Parts have to pass grueling Ford "torture" tests before being approved for manufacture.

That's why it pays to insist on "Genuine Ford Parts." They're made right to fit right to last *longer* in your Ford!

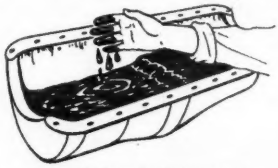
Keep your Ford all Ford

Care and Feeding of Engines

BY S. P CORP

CRANKCASE DILUTION

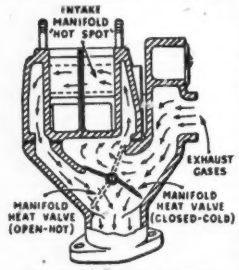
Driving habits can contribute to sludge in your crankcase and sluggishness in your engine. Slow speeds and short trips keep the engine too cool to vaporize the normal condensation. Sludge results. You can help correct this by changing oil oftener, draining out the water with the drained oil. Also, you can increase engine operating temperature by using a 180° thermostat —in which case, use only permanent anti-freeze. Sluggish operation may also be caused by a thermostat which is stuck in the open position. If your water gauge shows engine to be operating at less than 180°, have thermostat checked or replaced with a new one.



SLUDGE IN THE CRANKCASE

MANIFOLD HEAT CONTROL VALVE

The job of the manifold heat control valve is to heat the fuel mixture during engine warm-up, while the valve is closed. It should open thermostatically as soon as the engine is warm. If it is stuck and stays closed, the fuel stays too hot and too lean, the engine may miss, the effect of a good tune-up be ruined. Don't blame spark plugs until you check this valve, which is mounted in exhaust manifold below the carburetor. (In Ford V-8's, it is in the cross-over pipe ahead of the right manifold.) If you find this valve is stuck, free it by lubricating with a mixture of kerosene and soda, or use a good carburetor cleaning fluid.



MANIFOLD HEAT CONTROL

YOU NEED THIS FREE MANUAL

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Sealed Power
PISTON RINGS

Pod

[*Continued from page* 158]

inwale. Drive two 3 in., No. 14 screws horizontally through the gunwale and inwale and into the block and four of the same screws horizontally through the transom and into the block.

Finally, shave off all excess material so that the entire hull is trim and smooth. Putty over all screw heads, sand the hull down and paint it. Every surface should have three coats of marine paint, sanded lightly between coats. •

BILL OF MATERIALS

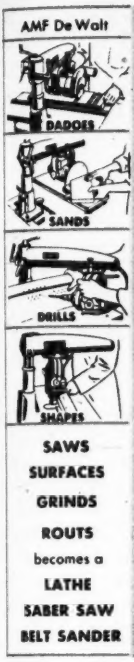
QUANTITY	SIZE	USE
EXTERIOR FIR PLYWOOD		
1 piece	1/4"x4'x16'	Side planks
1 piece	3/8"x4'x12'	Bottom plank, stern seat and bow seat.
CLEAR, EDGE GRAIN FIR		
2 pieces	1"x3"x12'	Chines
2 pieces	1"x2"x14'	Seat risers
2 pieces	1"x2"x16'	Gunwale
2 pieces	1"x3"x16'	Inwales
1 piece	1"x3"x12'	Keel
OAK OR FIR		
1 piece	2 1/4"x3 1/4"x3'	Stemson
1 piece	1 1/4"x1 1/4"x3'	Cutwater
1 piece	2"x10"x14"	Breasthook
1 piece	1"x8"x8'	Transom
1 piece	1"x3"x5'	Transom frames
1 piece	1"x6"x30"	Transom block
FASTENINGS		
2 gross	1 1/4", No. 8	FH brass wood screws
1 gross	7/8", No. 7	FH brass wood screws
4 dozen	1", No. 8	FH brass wood screws
3 dozen	1 1/2", No. 8	FH brass wood screws
1 1/2 dozen	3", No. 14	FH brass wood screws
1 dozen	2", No. 9	FH brass wood screws

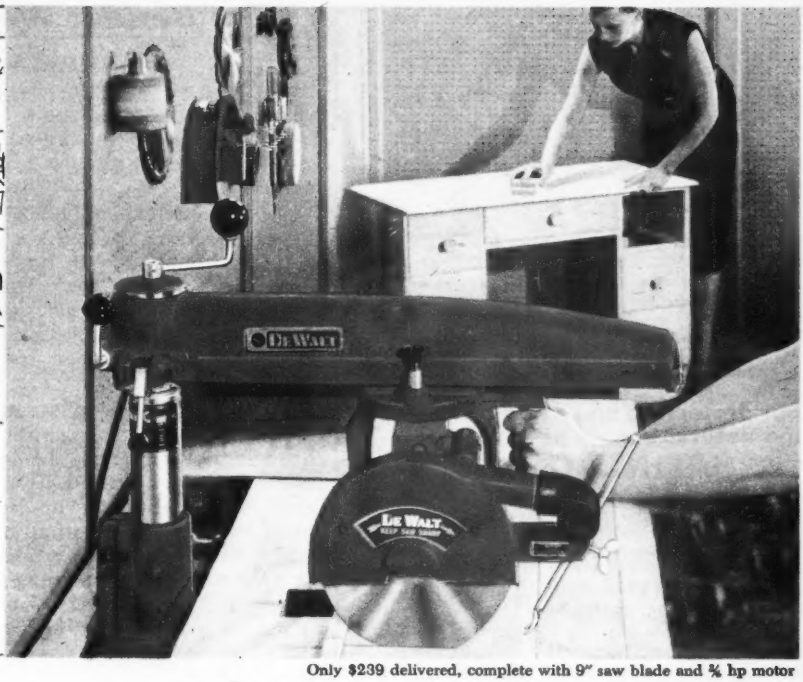
Floor Receptacle

[*Continued from page* 117]

connection between the light fixture and the box projecting into the cellar ceiling. Half-inch holes drilled through the beams will permit you to make a neat installation. Solder and tape the two cable lines to the existing line before replacing the light fixture.

Next step is to connect the two ends of the BX to the binding posts on the twin receptacle. (If your wiring is polarized make sure you follow suit. In other words, always connect black wire to black wire and white to white.) Now insert the receptacle in the steel box, secure it with the screws provided and you are all finished.—*R. B.* •





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The Bendix Washer

[*Continued from page* 112]

gasket and remove the housing and the jackshaft assembly as a unit. The low gear and clutch assembly will usually come out while the pressure plate will remain on the motor shaft.

Lift the clutch from the housing, remove the snap retaining ring, remove the old plates and replace with new ones in the same order. The clutch release spring should be replaced if it lacks sufficient tension. It is also advisable to put in a new transmission seal when replacing the clutch.

The unit may now be reassembled, 5¾ ounces of No. 300 refrigeration oil added through the vent pipe, the belt replaced and the clutch adjusted. This adjustment consists of tightening or loosening the screw located at the bottom of the spring until there is 7/32 to ¼-inch clearance from the solenoid to the plunger.

7. To replace jackshaft bearing or seal.

Remove the transmission as above, pull off drive pulley and remove the jackshaft assembly. The bearing will stay on the jackshaft but may be pressed off.

The old seal is removed by driving it out with a punch and hammer. The new seal, coated on the outside with Glyptal, is driven into place with a block of wood and a hammer.

The jackshaft assembly, the low speed drive gear and the clutch is replaced, the transmission is reassembled, and the oil is replaced.

8. To replace motor shaft seal.

Remove the transmission and motor assembly from the washer, the transmission housing and gears from the motor end bell and the clutch release spring and pressure plate from the motor shaft. Next, take off the cup washer on the motor shaft and the thrust ring from the slot in the motor shaft. Remove the motor end bell by removing the four through bolts. Pull out the old seal with a hooked tool inserted through the motor shaft bearing from inside the housing, being careful to avoid damaging the bearing. Insert new seal with special

[*Continued on page* 168]

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The Bendix Washer

[*Continued from page* 166]

seal installing tool and re-assemble transmission.

9. To disassemble jackshaft assembly.

Remove clutch plates, as previously described, then the transmission drive pulley and the jackshaft assembly. Next, remove the thrust washer on the inner end of the jackshaft, taking note of the groove which must go next to the high gear. Remove the high gear snap ring, high speed gear and key, the spacer, the low speed gear and key and the final spacer; the jackshaft bearing is a press fit. It is recommended that any transmission matching gear should also be replaced to assure quiet operation. When assembling the jackshaft assembly make sure that the counterbored sides of the high and the low speed driven gear face one another.

10. To replace water pump seal.

Remove the hose from the tub to the pump, the two pump solenoid wires and the two screws holding the solenoid. The pump cover will come off when its five screws and the shaft, used as a rod on which the solenoid arm rocks, are removed.

An Allen screw holds the impeller but it will probably be necessary to use a special impeller puller to remove it from the shaft.

Replace with new impeller and new seal (coated with Glyptal) making sure of perfect alignment by using a special pump seal tool.

11. To clean drain screen and valve.

The drain screen, located in front of the cabinet directly below the clothes door, should be cleaned of lint after each wash. When washing certain new fabrics such as blankets or rugs, the machine should be stopped and the screen cleaned during the cycle, possibly at the end of the soak or the wash period.

If foreign articles get past the screen they may become lodged in the drain valve, causing continuous draining. When this occurs the hose must be removed to get at the drain valve seat for cleaning.

12. To service "Vernathrem" inlet and mixing valve assembly.

The inlet valve coils are removed by disconnecting the wiring harness, prying off the spring clips from the top of the plunger cover. Remove the steel coil covers noting the position of the terminal strip, then lift the coils from the valve assembly.

Either plunger is replaced by first removing the coils, then the four screws securing the plunger cover to the valve body. The plunger (or parts) will slide out of the sleeve.

The diaphragm, located just below the plunger cover may be replaced after the cover has been removed.

The inlet screen is replaced by prying the old one out with a screwdriver and inserting the new. It may be seated by tapping lightly around its outer edge.

13. To adjust water level.

a. Float Switch Models

With no clothes in the cylinder pull the power plug at the end of the soak period, open the front door and note the water level. The limits are from the door opening edge to ¼ inch above. If the water level is low, move the bottom clip on the float rod down by an amount equal to the distance between the water level and the door opening edge. If it is high, move the bottom clip up ¼ inch; check and repeat if necessary at ¼ inch steps until the proper level is reached.

b. Pressure Switch Models

Turn the screw located in the center of the Bakelite pressure switch to the right (clockwise) to raise the water level, to the left to lower the level; a ⅛th turn will vary the water level about ¼ inch.

14. To replace water temperature control/switch.

Remove the dial by taking off the clip of the dial from the underside by holding the clip with hand or pliers and turning the dial. Remove the bolt and nut holding the indicator arm, then the mounting screws on the bracket and swing the bracket to get at the switch. Remove the two screws holding the switch and arm unit from the switch top. Replace. •

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Golden Hammer Awards

[*Continued from page* 137]

Robert A. Wiggins, Florence, Ky. . . . Geo. R. Huff, Jr., Rockwell City, Iowa . . . R. Comrie, Sharon Springs, N. Y. . . . H. C. Aylor, Florence, Ky. . . . Ray Tryban, Chicago, Ill. . . . John Shaver, Los Angeles, Calif. . . . F. Oldenburg, Harper Woods, Mich. . . . Le Roy N. Parsh, Jr., Cleveland, Ohio . . . W. Kenneth Greene, Roulette, Pa. . . . Harold H. Schimming, Albuquerque, N. M.

The following craftsmen have been awarded CERTIFICATES OF MERIT for their projects:

J. Alan Romich, Milton, Fla. . . . Nicholas D'Apuzzo, Ambler, Pa. . . . Walter Heaton, Jr., Hamilton, Canada . . . W. W. Ryan, Jr., Newark, Ohio . . . Max Gray, Minneapolis, Minn. . . . J. A. DeBin, Lincoln Park, Mich. . . . G. S. Cowham, South Linco, England . . . Jean N. Thomas, St. Petersburg, Fla. . . . H. E. Kennedy, Toronto, Canada . . . Joseph H. Rose, Falmouth, Va. . . . Robert J. Osendorf, Sauk Centre, Minn. . . . Michael J. Hamernik, Bristol, Conn. . . . William Maloney, Jr., Paterson, N. J. . . . Richard A. Hartford, San Diego, Cal. . . . Richard P. Clark, Louisville, Ky. . . . Mrs. Mabel Smiley, San Bernardino, Cal. . . . John R. Hero, Westboro, Mass. . . . W. V. Gillgan, Toronto, Canada . . . Donald Buscombe, Port Dover, Canada . . . Leon Olds, Portland, Me. . . . Ray F. Yahnke, Malden, Mo. . . . Frederick P. Schmitt, Hollis, N. Y. . . . Julia Larson, Saginaw, Mich. . . . Leon L. Brown, San Antonio, Tex. . . . Ernest Rosengren, Bridgeport, Conn. . . . Gerald Sparks, Orlo Vista, Fla. . . . J. R. Burr, Norwood, England . . . Gordon R. Scott, Alpena, Mich. . . . Worley Evans, Coco Solo, Canal Zone . . . H. R. Mark, Centre Hall, Pa. . . . James Spoerl, Green Bay, Wis. . . . Joseph Storiale, Shelton, Conn. . . . Loreto Lee, Philippine Islands . . . Daniel Hawk, Dallas, Tex. . . . Walter Pederson, Poulsbo, Wash. . . . Olive Lufkin, Bradford, Vt. . . Edward J. Bender, Chicago Heights, Ill. Earl Mabee, Compton, Calif. . . . Charles D. Hedrick, Huntington, Ind. . . . Howard Murphy, Milton-Freewater, Ore. . . . Gilbert W. Brong, Valley Stream, L. I. . . . J. Louie Oakley, Providence, N. C. . . . Guy Houghton, Killdeer, N. D. . . . Lorne E. Sorge, Dunnville, Ontario, Canada . . . Vincent Antonelli, Cheswick, Pa. . . . John Gamble, Everett, Wash. . . . Andy Galeaz, Campus, Ill. . . . Peter Sek, Jr., Scranton, Pa. . . . W. T. Rogers, Billings, Mont. . . . Ed Pike, Hayti, Mo. . . . T. Yates, Jr., Guelph, Ontario, Canada . . . Milton J. McColm, Santa Fe, N. M. . . . Sande R. Jones, New York, N. Y. . . . Frank F. Himpsl, West Orange, N. J. . . . Willis B. Churchill, Lansing, Mich. . . . George Palmeter, Montpelier, Ohio . . . Carl L. Youngs, Schenectady, N. Y. . . . Lemuel J. Dobson, Sioux Falls, S. D. . . . G. Ridley, Manhattan Beach, Calif. . . . Anthony D. Viesti, Newburgh, N. Y. . . . Andrew Kovschak, Hopewell, Va. . . . Jack L. Miller, Arlington, Calif. . . . John Hiza, Palisades Park, N. J. . . . Louis Micciullo, Rangeley, Me. . . . Herbert A. Miska, Flushing, N. Y.

Watch for the names of more winners next month. •

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Double-Duty Wall-Klips *included* with these socket sets

Bright red or green baked enamel finish Wall-Klip of sturdy, one-piece construction that keeps tools orderly and firmly in place yet easily removable as needed. Two key-slots for wall mounting. Wall-Klip with following 19-piece Indestro Socket Set No. 1454: ½" Hex Drive: 8 Sockets, 7/16" to 15/16"; 6¾" Ratchet; 9½" L-handle, Screw Driver Adaptor; ¼" Hex Drive: 5 Hex and 2 Square Sockets and 4" L-handle. An 11-piece set with Wall-Klip is also available, if preferred.

Klip-Tite Holders *included* with these Indestro Wrenches

Box End Wrenches illustrated are packaged in red-enameled metal holders that open up to form convenient wall-bracket with two holes for easy mounting. Six wrenches in Klip-Tite Holder:

No. 910-5W, Range 3/8" to 1": Set includes 3/8 x 7/16", 1/2 x 9/16", 5/8 x 11/16", 3/4 x 25/32", 13/16 x 7/8", 15/16 x 1". Also available with Combination Wrenches.

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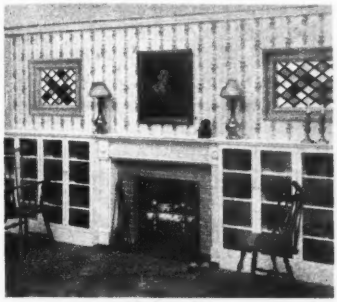
IDEAS FROM WELDWOOD

THIS MONTH'S PROJECT—DRESSING UP A FIREPLACE WALL



Look what Weldwood paneling and a dash of imagination did for this 1926 living room! Weldwood paneling really makes a remodeling or modernization job a snap. In this room, Cherry V-Plank* paneling was used. The big 4′ x 8′ panels go up quickly and easily, are grooved to give that random-plank effect. And the grooves are spaced to fall on 16″ centers and hide nail holes. (Paneling may be installed *without* nails by using Weldwood Contact Cement.)

Weldwood paneling, you know, ends forever the need of painting or redecorating. It's a one-time investment—and not a very high one, at that. For example, in this room, all that Cherry V-Plank—including that used as facing for radio-phonograph compartment (left) and desk-bookcase unit (right)—costs only $107. That's the first and the final cost!

Remodeling this room is the featured project in the latest issue of Delta Power Tool's "Deltagram." To get your copy—which even includes step-by-step directions for making all the built-ins—just send coupon.

*Trade Mark

The Weldwood Question Box

Q. I have a sort of "free form" curved bar in my cellar, and I would like to wood panel it. Is there any way I could bend wood paneling to fit curves?

A. Yes. If the curves are not "too curvy," you can use ordinary Weldwood hardwood plywood paneling. Use ⅛″ thick paneling—(available in a wide range of woods)—and nail it on or attach with Weldwood Contact Cement. Paneling ⅛″ thick has enough "give" to bend to some degree. If, on the other hand, the curves are too acute, the only other method is to groove the back of the panels to allow them to bend. This method is tricky and we would recommend it only to experienced woodworkers.

HAVE A QUESTION?
Send it to "The Weldwood Question Box," 55 West 44th Street, New York 36, N. Y.

This Month's Hints

1. Your breadbox will do double-duty if you follow this suggestion. A piece of Weldwood plywood attached inside the door of a front-opening breadbox serves as a bread cutting board whenever the door is opened. Attach plywood to door with Contact Cement, or drill and use nuts and bolts. R. W., Union, N. J.

2. ¼″ and ⅜″ scraps of Weldwood Plywood can be cut into triangular shapes and used as gussets to strengthen the corners of window screens, shipping crates, doors, etc. L. M., Lincoln, Indiana.

$10 for your ideas
for "This Month's Hints," if accepted for publication. (Hints *must* apply to some Weldwood product.) Send them to "Weldwood Hint Editor," 55 West 44th St., New York 36, N. Y.

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Nozzle Of Mr. DeLaval

[*Continued from page* 160]

why it works better in the pure vacuum of outer space.

Here we have a simple molecular engine, using the motion of free molecules directly instead of through cams, levers, etc. The pressure bottle moves because of an unbalanced force shoving on its front end. Likewise, a rocket moves in the same manner by molecules pushing on the *front* of the combustion chamber.

If one wishes to increase the velocity of the molecules leaving the rocket motor, the easiest way is to heat them up, which is exactly what takes place in the combustion chamber. Propellants are brought together and burned, thus creating large volumes of very hot gas molecules under pressure. Their motion is random, by the way, even if there is an open end to the combustion chamber. Wouldn't it be more efficient if we could convert all the random motions of these hot molecules to one type of motion: linear motion to the rear? Certainly, and we have device to do it, too.

It is called a DeLaval nozzle, named after a French physicist of the 19th Century who did much experimental work in studying gas motion. It consists of three parts: (a) a convergent section, (b) a narrow throat, and (c) a divergent section.

No matter how fast the molecules move in the combustion chamber they can never exceed the speed of sound. For a more detailed explanation of this, see any college physics text. Now, let's follow a group of randomly moving gas molecules through the DeLaval nozzle of a rocket motor.

Being pushed out of the chamber by the pressure generated in the combustion process, they reach the converging section of the nozzle. Here, some of them begin bouncing off the converging walls, and the gas stream begins to narrow down. Their velocity increases and starts to become motion in one direction. As they reach the narrowest portion of the throat, they are moving at exactly the speed of sound, a figure de-

[*Continued on page* 175]

"I DUNNO... SAYS HE DOES IT WITH BURGESS BATTERIES"

Wanna Make A Tintype?

[*Continued from page* 152]

or glass trays. Regular porcelain enameled trays should not be used. The light for opening the package of plates, printing and developing should be a Series OA or Series I safelight.

The technique is very similar to making an ordinary contact print. As outlined in the photos, the first step is to mix up the developing and fixing solutions. The material is a good deal less sensitive than ordinary contact paper and you will find that the average exposure will run to about a minute.

After determining the correct exposure (test strips are included with the plates) develop to full density, about five minutes. Rinse the plate and fix for one minute in the fixing bath. At this stage the image is a pleasing sepia tone. If you prefer a sepia tone, well and good. You can stop at this point. However, if you prefer the conventional black-and-white image, the plate should be toned in the gold toner which is part of the kit. Mix the gold toner as directed and immerse the plate for about two minutes. Then wash the excess toner away under running water.

The next step is a rather unorthodox one for the plate is now boiled in distilled water for thirty minutes. The final step consists of polishing the plate with a soft cloth. A high gloss can be obtained by using wax or even a mild metal polish.

When you are finished, you will have a permanent picture whose image is actually embedded in the metal. It cannot burn, break, become dog-eared, dirty or scratched.—*R. B.* •

The Lunar Eclipse

[*Continued from page* 159]

cially effective at the striking "Japanese lantern" stages just before and after total obscuration.

Pictures are better in color, because the moon assumes varied hues as its crosses the penumbra, or partial shadow, and then the full umbra shadow. Terrestrial atmospheric conditions govern the amount of sunlight reflected to the moon and that is why it glows a dull red even during

[*Continued on page* 190]

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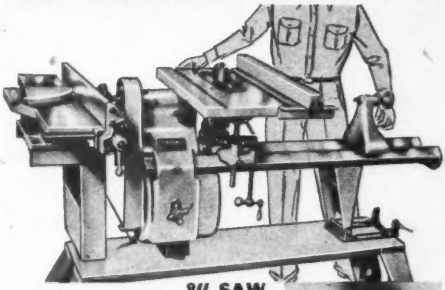

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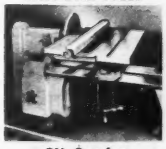
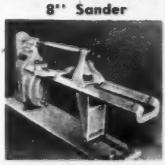


8" Sander



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Never before have you seen so much deluxe, precision-built power tool workshop at any price! Designed for the man who wants the best. Massive castandprecision-machined headstock, self-centering inverted "V" bedways (like precision metal lathes), exclusive non-friction speed changer, extra-large cast and precision-ground saw table. 100% ball bearing, lifetime-lubricated. You save by ordering direct from factory. You are invited to test Supershop Model X in your home FREE. Mail coupon or postcard for FREE brochures, photos, details, specifications, accessory list—and amazing freight prepaid FREE HOME TRIAL PLAN. All free.

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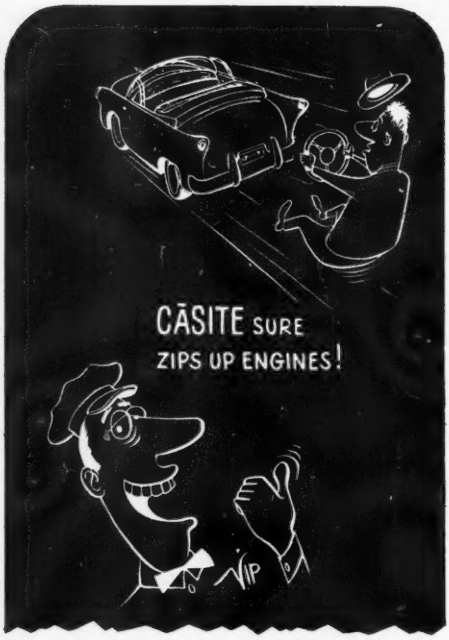

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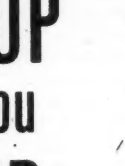

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in any weather...
install a
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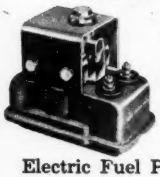
electric fuel pump



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Enjoy dependable *fast* starting every time you step on your starter! From the moment you turn your key, the Stewart-Warner Electric Fuel Pump delivers a steady, uninterrupted flow of gas to your engine. Ends vapor lock, gives positive starting and more reliable performance the year 'round, regardless of weather. Operates independently of engine. Easy to install. In use today on hundreds of thousands of vehicles. Ask about the Stewart-Warner Electric Fuel Pump at your garage or car dealer today!

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CUSTOM-CRAFT - BUFFALO 7, N. Y.

Nozzle Of Mr. DeLaval

[*Continued from page* 172]

pendent upon the characteristics of the gas, its temperature, and its pressure. They cannot exceed the speed of sound at the throat. But upon entering the divergent portion of the DeLaval nozzle at the speed of sound, they begin to act entirely different. Moving at sonic speed, they are bounced out along the diverging section with a decrease of pressure—and they are speeded up.

How does one increase the exhaust velocity of a rocket if he is limited by the speed of sound at the throat of the nozzle? Almost elementary. The speed of sound increases with temperature and pressure. Merely increasing the temperature of the combustion process and the pressure inside the combustion chamber does the trick. Of course, there are other problems here, such as melting points of the metals of the motor. But the speed of sound in a medium is also dependent upon that medium, so select a propellant combination which will give a gas with a high sonic speed! •

Strike It Rich In Africa

[*Continued from page* 63]

hiring. Addresses of the Chambers can be gotten from the U. S. C. of C., Washington 6, D. C. Ask for the free listing of American Chambers of Commerce in Foreign Countries.

A good example of the Yank outfits in Africa is Firestone Tire and Rubber Co. Firestone employs foresters, agricultural specialists, nurses, lab technicians, sanitation engineers, accountants, mechanics and machinists. (Write to Personnel Dept., The Firestone Tire and Rubber Co., Akron 17, Ohio.)

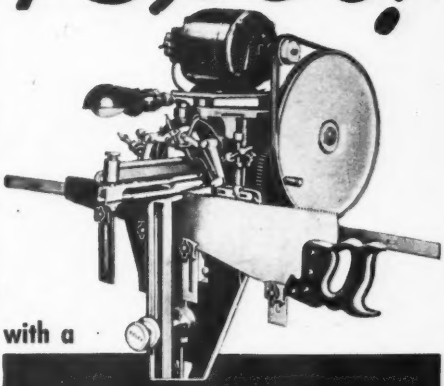
To go to Africa on your own, you need (a) a passport and (b) a visa, the former obtained from your country, the latter from the country for which you're headed.

The various countries have different admission requirements, but generally you need either a certain amount of money or a job to get in. More detailed information can be obtained from the countries themselves.

[*Continued on page* 178]

Last Year's Profit

$3,000!



with a

FOLEY *automatic* SAW FILER

"Last year's profit amounted to $3,000. Not so bad for a one-man outfit" — from Chas. C. Hough. James B. Williams wrote us—"I made $765 last year filing saws, and it sure comes in handy. I do this work in my spare time." Men in communities of all sizes make up to $3 or $5 an hour with the Foley Saw Filer working full or part time.

It's no trick to take care of the saw filing for your neighborhood hardware or lumber dealer — plus looking after the saws for farmers, townspeople, manual training departments and factories. The Foley files all hand saws, also band and cross-cut circular saws. It's a repeat cash business, no canvassing, no eyestrain and no experience needed.

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"MONEY MAKING FACTS" shows just how you can start at home in your spare time working in your basement or garage. It's an immediate cash business that can develop into a full-time repair shop. Send coupon today—no salesman will call

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ACTION

starts with AC...

...the spark plug others follow!

AC Spark Plugs paced the modern trend to high-compression engines and high-octane fuels! AC Spark Plugs pioneered the most impressive list of advances in ignition history! There's an out-ahead AC Hot Tip Spark Plug specifically designed to get the best performance from your car's engine. Insist on AC Spark Plugs.

FIRST with the stronger, one-piece heat-sealed shell construction.

FIRST in welded side electrode construction for better heat and electrical conductivity.

FIRST to incorporate a resistor element for elimination of radio interference from ignition.

FIRST with fused metal-ceramic seal to stop center-wire compression leakage.

FIRST in the use of unglazed insulator tip to resist lead attack.

FIRST with the aluminum oxide insulator in the United States — a patented AC composition!

FIRST to use greater "scavenging" area between insulator and shell.

FIRST with the long, thin, recessed, quick-heating insulator tip — the AC Hot Tip — an AC exclusive!

FIRST with the copper-core electrode to improve performance under special high-temperature operating conditions in commercial applications.

hot tip spark plugs

CHANGE AT LEAST EVERY 10,000 MILES

AC SPARK PLUG THE ELECTRONICS DIVISION OF GENERAL MOTORS

"ARCO JIG-SAW"
WITH EXCLUSIVE NEW
CIRCLE-CUTTER & RIP GAGE!

"ARCO JIG-SAW" IS A PORTABLE SAW
AND CAN BE USED AS A TABLE SAW!
(with "Arco Stand" shown at right). "Arco Jig-Saw" guaranteed to fit any 1/4" drill with Adjustable Circle-Cutter & Rip Gage saves hours of work—assures professional results. Cuts perfect circles up to 20" diam., rips accurately up to 10" wide. Cuts intricate patterns—however large—in plywood, plastics, metals—even slips thru 2x4's! Has same capacity & cutting speed as $55 jig saws. "Air-Jet" blows away sawdust. Includes blade.....
"ARCO STAND"—Casting & Clamp $2.95
6 Extra Assorted Blades..... $1.95
At your Dealer or try it on our 10-day Unconditional Money Back Guarantee.
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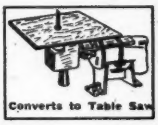
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Build over 50 modern boats from large scale plans, available with FULL-SIZE patterns, new PRE-FAB frame kits! All types: prams to cruisers, 6 to 25 ft. Best buy for Amateurs! SEND 10¢ for CATALOG.
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Drive it for 75¢ per week. Rider Agents wanted—earn your own car free. Also KING MIDGET JUNIOR chassis, finely engineered, ready to run and priced at a fraction of any similar car. GET THE FACTS. Send 25¢ for 32 page picture book giving special prices and agents proposition on both cars. Or send $1 (refunded first order) for this plus actual assembly book and service manual.

MIDGET MOTORS CORPORATION
Athens 3, Ohio

Strike It Rich In Africa

[*Continued from page* 175]

For dope on South Africa, write to the Government Information Office, Union of South Africa, 655 Madison Ave., New York 21, N. Y.

For information on Liberia, write to the Public Relations Counsel, Embassy of Liberia, 5201 16th St. N. W., Washington, D. C. Information will also be given by the Liberia Consulate General, 220 Broadway, New York 38, N. Y. Liberian consulates are also located in Chicago, San Francisco, Los Angeles, New Orleans, Miami, Houston and Philadelphia.

For data on the Belgian Congo, write to either of the following: Baron Dhanis, Belgian Congo Affairs Attache, 1715 22nd St. N. W., Washington, D. C., or Belgian Government Information Center, 630 5th Ave., New York 16, N. Y.

Can you take money out of Africa if you hit the jackpot so hard it clangs? That depends on the country—each has its own regulations on this—but most countries do permit individuals to take out a percentage of their earnings.

Now obviously, while it's true that a rip-roaring boom is underway in Africa, there are drawbacks too. Let's list some:

Climate is one factor which must be considered strongly. South Africa, Liberia, coastal areas in the north generally have excellent climatic conditions but there are sections deep inside where the jungle is steaming, the rain seems to fall incessantly and the insects make life one long itch.

Racial tension is another vital consideration. Kenya, for instance, has its terrible Mau Maus, now on the wane but still something to reckon with. In the Union of South Africa, there is immense, unorganized resentment growing among the non-whites against the white man's absolute, rigid supremacy. And a good place to stay away from is the shooting-war area of Algeria where the tide of hate runs high.

But the timid and overly delicate have never thrived in the world's frontiers. You can't go fortune-hunting anywhere with an absolute guarantee of personal safety and the assurance that your finer feelings will never be offended. Africa today is the Bright Continent, lit with a blaze of opportunity for the venturesome. •

NEW...

Peters "Thunderbolt" 22 shorts!

More BANG! More ZIP! More FUN!

Here's the exciting new cartridge that makes your 22 shooting more fun than ever before! Gives you more wham! More zip! Shooters know they have *extra* speed when they hear the sharp crack of these sensational new cartridges. Specially developed powder for faster ignition, faster burning and greater speed! New, exclusive, specially designed composition bullet. And Peters "Thunderbolt" 22's come in a convenient flat pack—wrapped in protective cellophane—with zip-tape opener.

Get a supply of Peters "Thunderbolt" cartridges at your dealer's next time you stop in for ammunition.

"The farmer is the hunter's best friend — treat him that way!"

PETERS *packs the* **POWER**

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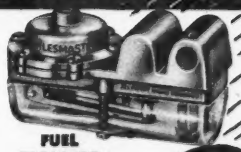
Reg. U. S. Pat. Off.

PETERS CARTRIDGE DIVISION, BRIDGEPORT 2, CONN.

"Thunderbolt" is Reg. U. S. Pat. Off. by Peters Cartridge Division, Remington Arms Company, Inc.

GOTTA COMMON CAR COMPLAINT?

- ☐ Hard starting
- ☐ Engine dies
- ☐ Rough idle
- ☐ Jerky acceleration
- ☐ Low gas mileage



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$6.95

You need a

MILESMASTER

Milesmaster cures engine troubles

It regulates fuel pressure. Keeps raw gas from flooding engine and washing lubrication off cylinders and pistons. Reduces so-called vapor lock. Prevents crankcase dilution which forms harmful gums. Eliminates ignition fouling. Saves wear and tear on carburetor float and needle.

New motoring thrills

If you want a new thrill from smooth, step and go, economical engine operation, have your dealer install a Milesmaster. Save its cost in first few thousand miles.

What MILESMASTER does for your car

- Saves gas
- Reduces wear
- Prevents dilution
- Provides smooth idle
- Eliminates flooding, percolation, vapor lock
- Filters the fuel
- Traps steel and rust particles

Money Back Guarantee
Have your dealer install MILESMASTER ON your car. Drive it for two weeks. If not completely satisfied, your money will be refunded in full. MILESMASTER, INC.

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NEW STANLEY *Glide-O-Matic*

- Positive lock
- Automatic return
- Steel scribers

This rule locks at the measurement you take. Set it, forget it; the rule remembers when you push the lock button.

And when you release the lock the blade glides smoothly home into the gleaming case.

No pencil needed! Glide-O-Matic marks your measurement with hardened steel scribers.

For inside measurements, use the back of the tape. It's graduated in red with the first two inches omitted to compensate for 2" case.

Be precise. Say Stanley. Ask for Stanley Glide-O-Matic at your favorite hardware store. It's a *good* rule.

3 sizes, each in plastic utility box:

8 ft.—$1.98 10 ft.—$2.39 12 ft.—$2.89

For free booklet on measuring tools and how to use them, write Stanley Tools, Division of The Stanley Works, 96 N. Elm St., New Britain, Connecticut.

STANLEY

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MAIL FOR McCAHILL

Uncle Tom is sorry he can't answer all his mail personally. In this column he'll answer the most interesting letters. Write to him at MECHANIX ILLUSTRATED, 67 West 44 St., New York 36, N. Y.

● *On several occasions I have been warned by oncoming cars, especially trucks, flicking their lights at me that a speed trap or radar station was just ahead, and to slow down. Though I never actually exceed the speed limits by more than five or ten mph at most on the open highway, I feel I've been saved tickets on several occasions by trucks that blinked their lights at me. Don't you feel this is a real sporting gesture on the part of the trucks —or are they compounding a felony?*

Ray Horowitz
Baltimore, Md.

It's not only sporting of the trucks and other cars that do this but it brings back some meaning to the term, "Knights Of The Road." I'm all for this practice. However, as you know, at least two out of every ten people arrested for speeding should get the book thrown at them for overdoing it. For the guy who only lets his speed climb five or ten miles over the limit, I think it is a nice gesture to tip him off when speed traps are ahead.

● *Toledo still has signs on all the main entrances to the city that say, "Close Mufflers Thru City." How come, Uncle Tom?*

Bert Winninger
Milwaukee, Wis.

I understand the Mayor still drives a Stutz Bearcat.

● *I've noticed that when my car has stood in a garage unused for several days, when I first take it out it sounds like I was running on square wheels and every tire seems to make a large thump. However, after driving for awhile this thumping gradually lessens—in fact, it seems to disappear. What's the deal?*

Walter Sullivan
Denver, Colo

When a tire stands unused for a period of time, supporting its share of the heavy weight of the car, it takes a slight set on the bottom. How much of a set depends entirely on the make of tire and the weight of the car but even the finest tires will get slightly out-of-round if unused for a period of several days. However, if they are good tires and fairly youthful, after they've run a few miles and are warmed up, most if not all of this thumping will disappear as the tire goes back into shape. Old-fashioned as it seems, if you plan not using your car for several weeks or months, jacking it up so all four wheels are clear of the ground will prevent long-set lumping that may never come out, especially if the tire is a year or two old.

● *In Bob Sylvester's recent book, No Cover Charge, he told how John Perona has been bucking for a charity road race through Central Park in New York. He thinks it would be the greatest sporting spectacle of all time. What do you think of the idea?*

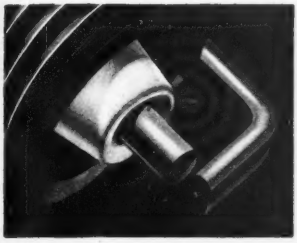
P. Franklin
Wilmington, Del.

I'm all for it. In fact, I first had the idea when Perona was running a gin mill in West 49th Street during prohibition and I've been plugging it ever since. However, all the sporting blood was drained out of the New York City government on the demise of Jimmy Walker.

[*Continued on page* 182]

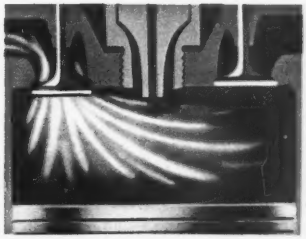
IS YOUR CAR AN OVERHEAD-VALVE V-8? Here's proof that only new Power Tip can "fire up" your engine at all speeds!

Why was new POWER TIP developed?



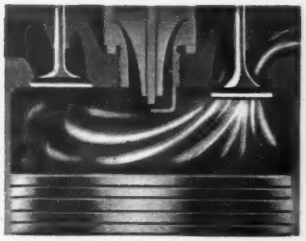
Ordinary plugs frequently fail to give top performance in today's higher-compression, higher-horsepower engines in *both* city and highway driving. New Power Tip was designed especially to give top performance and economy at *all speeds.*

What does it do for low-speed driving?



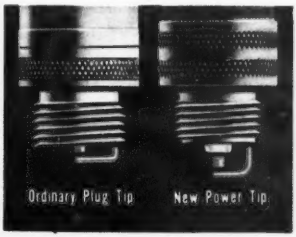
Power Tip extends into the heart of combustion—gets hot fast and *stays* hot at low speeds. Hot projecting tip burns away carbon and oil deposits—prevents low-speed fouling, commonest cause of sluggish engine performance and slow starting.

Does it stop high-speed pre-ignition?



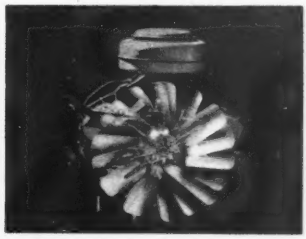
In high-speed, turnpike driving, amazing Power Tip *takes full advantage* of the cooling, refrigerating action of the richer air-fuel mixture at wider throttle. This "charge-cooling" effect cools projecting Power Tip and *checks* destructive pre-ignition.

How is POWER TIP different?



Projecting center electrode and ceramic tip . . . the Power Tip . . . extends spark gap in toward the center of the combustion chamber. Fuel burns more evenly and completely—"fires up" engines for peak performance and economy at *all speeds.*

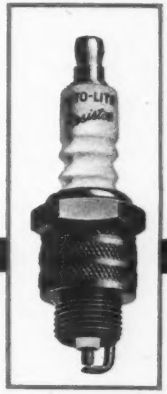
Who can use new POWER TIP?



You can, if you own a car with an overhead-valve V-8 engine. Power Tip was tested and *proved* in almost every make of today's cars. It is the *only* spark plug ignition-engineered for today's higher-compression, higher-horsepower V-8 engines.

Is it available now for all cars?

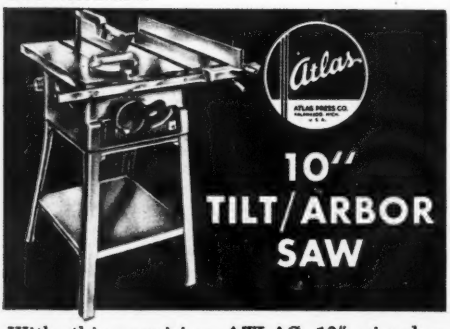
Power Tip fits all these cars with overhead-valve V-8 engines: Buick, Cadillac, Chevrolet, Chrysler, De Soto, Dodge, Plymouth, Hudson, Imperial, Ford, Lincoln, Mercury, Nash, Oldsmobile, Packard, Pontiac, Studebaker.



AUTO-LITE RESISTOR SPARK PLUG WITH POWER TIP

Auto-Lite manufactures over 400 products, including Spark Plugs, Batteries, Wire and Cable, and Automotive Electrical Systems . . . sold throughout the United States and Canada.

With this superb jointer-planer you can plane, end-joint, tongue, bevel, or rabbet wood of any size with unequalled accuracy, ease and safety. Satin-smooth, ripple-free finish. Larger table and fence, heavier solid-steel cutter-head spindle. This is the jointer-planer you need to give your work that professional quality. Ask any experienced woodworker. Write for descriptive literature.



With this precision ATLAS 10" circular saw you can do almost every basic woodworking operation . . . faster, more accurately, and with greater safety. You can crosscut, rip, miter, dado, and shape with greater ease, precision, and smoothness. Unexcelled for general carpentry, this great saw also gives you versatility you need for fine cabinet work, built-ins, trim, and furniture projects. It's the only saw with rigid triangular arbor support, balanced tilt mechanism, bigger arbor, push-pull depth and angle control, and double-locking lift-off fence with vernier control.

Write FOR FREE CATALOG

Atlas Press Company

11-52 N. PITCHER ST., KALAMAZOO, MICHIGAN

Mail For McCahill

[*Continued from page* 180]

● *In your safety article in the July issue you said that round tires are important to a car's safety when traveling at high speeds. Supposing a man buys safe tires but subjects them to rough roads and wears rubber off when starting and stopping. Then he goes on the highway for a nice cruise. Can this produce the same effect as driving with out-of-round tires that have been sold as round tires?*

Paul Hanke
Maplewood, N.J.

It can—and does.

● *It was always my understanding that the tax money we pay on gasoline was for the improvement and the building of better highways. This summer I bought a small cruiser and find that I am paying the same tax on gasoline that I pay for my car. In some states I can get all or most of the tax back by filling out numerous complicated documents, which in most cases have a time limit. I'll bet not 50 per cent of the boat owners bother to go to all this trouble and the states make a huge profit this way. Isn't this a racket?*

Jim Holmes
Norfolk, Va.

In polite society this motorboat gas racket by the states could be termed legalized robbery. I have a boat myself and on many tank fillings I've been taxed between $5 and $7 each time, so I know what you mean. Florida, however, has a completely honest approach. They tell you in advance that they are going to rob you, so it comes as no surprise when there is no kickback. Other states where I've bought gas for my boat demand notary signatures and in Georgia you need a Gasoline Vendee's Refund Permit even to apply. This pork-barreling amounts to tax thieving on the lowest plane, undoubtedly cooked up just to rob good old John Q. P.

● *If I save $30 a week, how long will it take to buy a 1955 white German Porsche Spyder? I'm serious.*

Carol
New York, N.Y.

On the eighth day you'll be able to make

[*Continued on page* 186]

133 PIECE SURPLUS POWER TOOL SET $2

Brand New—U. S. Gov't Surplus
Once in a Lifetime Bargain on Power Tool Accessory Set.
Guaranteed $11.00 Retail Value—
Now Yours for only $2.00.
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12½ Million Tools—Less Than 2 Cents Each

Now the famous Blue Steel Tool Co. can make this fabulous offer because they just bought out an an entire U. S. Gov't. Surplus warehouse—12½ million tools in all. Every single piece is absolutely and completely guaranteed to be of the first professional and industrial quality. If bought separately would cost you at least $11.00. But now yours for only $2.00, less than 2 cents apiece.

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You must order now to make sure you get this tool bargain of a lifetime.

Send $2.00 and 25c for postage and handling for one 133 piece set—$4.00 for (2) 133 piece sets or $6.00 for (3) 133 piece sets.

Because of the large number of tools we must ask for 25c for postage and handling on all one set orders. We absorb these costs on 2 or 3 tool set orders.
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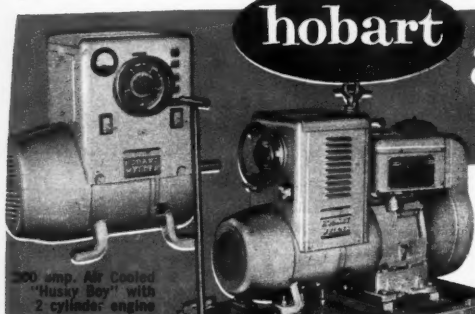

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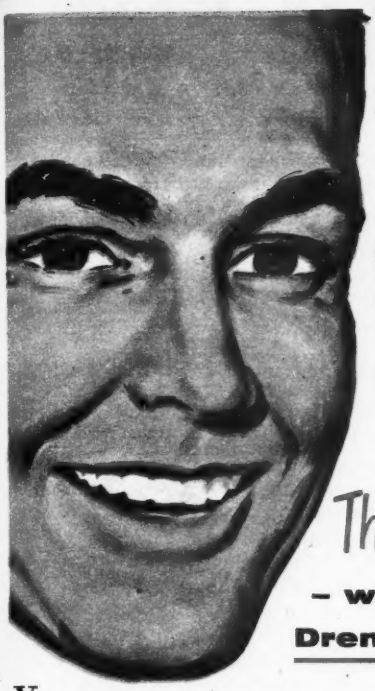

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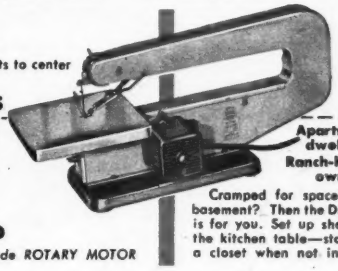

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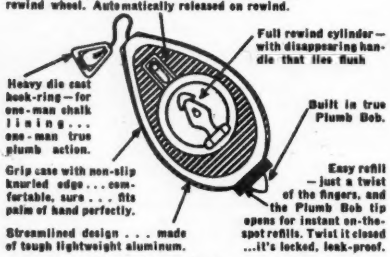

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Mail For McCahill

[*Continued from page* 182]

the entire amount at Belmont or Hialeah, if you have the right combination.

- *Would you believe me if I told you the other day I changed a tire and found a snake inside it?*

Fred Lindstrom
New Orleans, La.

No.

—*Tom McCahill* •

McCahill Tests '57 Ford

[*Continued from page* 93]

decapitated by the millions this year. Seriously, name me one advantage for a 14-inch tire and I'll buy it—but I'm sure I can name many disadvantages. This is not a diatribe against Ford alone for most of the lighter, smaller '57 cars are adopting this smaller wheel for lowering effects. Some of the bigger cars have been scared away from it by the fact that 14-inch wheels will necessitate the decreasing of brake circumference, which in some cases is dangerously low now. Back to Ford.

This year's Ford, and I've made the same statement in years past, is the biggest, most glamorous and highest-performing Ford ever built. However, in the past Ford, Chevy and Plymouth were considered small cars. To call the Ford for '57 a small car would be like labeling the *Queen Mary* a motorboat. This is a big car selling for what used to be big car prices, though in all fairness this price range spreads over a thousand dollars. You will note from the pictures that the tops of the front fenders are flatter, which is a pretty universal-for-'57 trend and another attempt for the lower look. The next step is to get the buyer to lie prone on the pavement while they slip skates under him.

Anyway, the '57 Ford is a great new car and as rugged as an Irish riot in a Russian saloon. From a quality standpoint Fords can't be topped in their class. From a reliability and endurance standpoint—well, just look at the Model A's still on the road. It's as sound an investment as an "E" bond and Ford won't be sending your money to Southeast Lapvania. If you like it, buy it—you won't go wrong. •

Simply assemble and finish our new water ski kit and you have a pair of skis worth twice the price of the kit. Skis are 7 ply moulded plywood, 67½" long, 7" wide, 9/16" thick. Sturdy rubber foot pieces. All parts plus instructions included — $18.00. Order from your Michigan dealer or MICHIGAN WHEEL CO., Dept. M-11, Grand Rapids, Mich. C.O.D. orders accepted.

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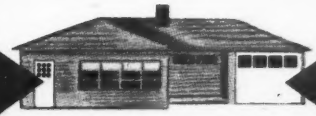

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StanStrip — 37c a foot any length.
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*TRADEMARK

The Standard Products Co. BOX 678B LEXINGTON, KY.

Makes Fish Of People

[*Continued from page* 69]

The action is similar to that of a pump, forcing the water out of the mask at the lower end.

Underwater, the students must duplicate their teacher's motions. He assists the first time they shed mask and lung. When shucking all the gear, he makes clear with his graphic hand signals that the beginner must start with the mask. Purpose behind this is that sometimes in pulling the breathing tube over the head it bumps into the mask and might frighten the student.

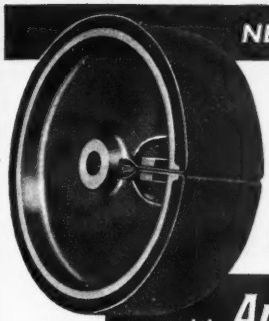
Final stages of Townsend's course take place above water. Togged out, he shows how to get into the water as though from a boat. If the craft has no deck, the diver sits on the gunwale, back to the water.

For a boat with a deck, Ed demonstrates a forward jump. Simply leap or walk feet first into the water. Diving headfirst is forbidden for the regulator can hump up and stun or injure the swimmer.

Completing the pool checkout, Ed carried the diving equipment in his hands, ascended the low diving board and jumped in feet first. When he emerged perhaps a minute later, he was completely "dressed out" and ready for underwater work or play. The class is required to do the same.

Pupils desiring an ocean trip are taken out to the reefs in Ed's boat. Either singly or in a group, he guides them on a tour of the fascinating coral formations. For the pool checkout and reef-roving junket combined, Ed charges $18. Price of the pool alone is $8, and "If anyone scares out or otherwise doesn't complete the course," he says, "they pay nothing."

Each sailing-diving voyage to the Bahamas that Ed conducts has been attracting a bigger passenger list. He charges $65 for a three-day cruise, furnishing diving equipment, food, beverages and lodging. So far, after nearly 30 such trips, he's beginning to worry. One fine day at the rate he's going, he'll have to ferry his people to the Bahamas with a vessel the size of the *Queen Mary.* •



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The Lunar Eclipse

[*Continued from page* 173]

total eclipse. As the November 17-18 event progresses, the moon is also swinging in closer to the earth. This will contribute to a maximum lunar image.

Here are the eclipse circumstances in Central Standard Time, together with complete filming information for stills and movies, from which you can set up your own operations schedules. In eastern longitudes, the closing partial phases occur low enough to permit including horizon foreground scenes or structures in series type pictures. Leave the camera in position until just before sunrise and then make a final exposure at one diaphragm opening smaller than that indicated by a light meter reading of the brightest part of the sky.

Moon enters penumbra (partial shadow)	**10:00 p.m.**
Moon enters umbra (total shadow)	**11:03 p.m.**
Total eclipse begins	**12:08 a.m.**
Total eclipse ends	**1:27 a.m.**
Moon leaves umbra	**2:33 a.m.**

Picture-Taking Instructions

If you want to take a series-type picture such as shown at the beginning of this article, mount your camera securely on a good, sturdy tripod. Look through the view finder and leave plenty of room for moon to "rise" without leaving the picture area. Load your camera with a medium speed film such as Verichrome Pan or

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Isopan. Make one exposure every ten minutes. Use the table below as a guide:

Deep in penumbra	1/50 at f-12.7
7 mins. in umbra	1/50 at f-11
17 mins. in umbra	1/50 at f- 8
27 mins. in umbra	1/25 at f- 8
37 mins. in umbra	1/25 at f- 6.3
47 mins. in umbra	1/25 at f- 5.6
57 mins. in umbra	½ sec. at f- 3.5
At totality	1 sec. at f- 2.8

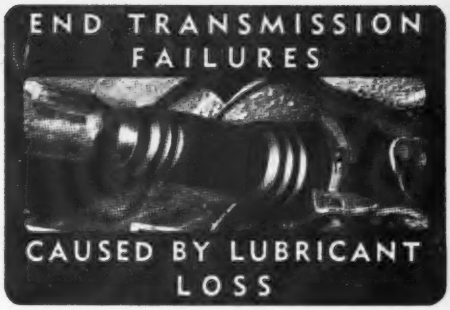
Use the following table if you want to record the eclipse on Kodachrome film; cut 1½ stops for Anscochrome:

Deep in penumbra	1/10 at f-11
Shadow bite	1/10 at f- 8
Half immersed	⅕ at f- 6.3
Deep in umbra	½ sec. at f- 4.5
Just before totality	½ sec. at f- 2.0
At totality	1 sec. at f- 1.4

Keep the camera in a fixed position and let the moon cross on a diagonal. Use the table below for taking movies with Kodachrome film. Shutter speed should be 1/30th or 1/40th of a second. Run off a one-second burst of film. Wait six minutes and run off another burst until the eclipse is at totality. Do not try to follow moon's path by panning the camera.

Part Shadow	f-5
Half-obscured	f-3.5
In umbra	f-2.5
At totality	f-1.4

—Peter A. Leavens •



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